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## ORIGINAL ARTICLES

### IS POLIOMYELITIS OF THE EPIDEMIC TYPE TRANSMITTED THROUGH INHALATION?\*

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The greater part of the experimental investigations made with the virus of epidemic poliomyelitis have been to show that it is due to entrance of the germ through the respiratory tract that the disease spreads. The evidence of this so far has been the finding that the emulsions of the nasal mucous membrane are infectious, and that when this is applied to the *scarified* nasal passages of another monkey, the disease may be given it. In the cages where monkeys for this work are kept no such natural transference has occurred.

As a matter of fact, we are still groping in the dark for some understanding of how epidemic poliomyelitis is carried, and so far no one has found a clue so well explaining the facts as to be generally accepted. Not knowing or being able to work with the causative agent directly because of its apparently prohibitory size, we are greatly handicapped.

It has been compared to epidemic cerebro-spinal meningitis, and workers have assumed a similar mode of transmission,

which in the latter is now generally thought to be through the nasal mucous membrane.

Enough is known of this paralysis and its nature to assist us very materially in its study by comparison and analogy with other better known infections. We are now familiar with many dissimilar modes of disease transference, and will probably find that epidemic poliomyelitis has its analogue in the diseases better known. For the purpose of this study we will assume that it is spread by some method with which we are familiar, for we have no right to assume that it is carried in a wholly unknown manner until we have excluded those with which we are acquainted.

We will also grant that several facts are known concerning infantile paralysis, some of which are of recent knowledge. These are as follows:

The disease is an acute, specific, transmissible infection.

It follows lines of travel, frequents localities, is largely found in rural districts, villages, and the outskirts of large cities.

\*Read before the Genesee County Medical Society, April 25, 1911.

When a region has been once infected, there is a tendency for other cases to occur in succeeding seasons, although in possibly fewer numbers.

It is not *directly* transmitted from patient to patient, for there is only occasionally more than one case in a household.

It is most prevalent in the hot months, from June to September, although few cases are reported at other times.

The organism is widely spread in the body at stages of the disease, and can be used to produce infections in other animals when given by inoculation; it is too small to see with our present means.

The most striking fact we find above is the marked season variation, which in other diseases means a great deal and should in this one.

From the bulletins of the Michigan State Board of Health for 1910 I have constructed graphic charts showing the seasonal variations in the various infectious diseases which are given there. These scales are drawn so as to show the relative variations from month to month, and not the relative relationships between the occurrence of the diseases. These lists used are the mortality figures, and do not give the exact occurrence of the diseases by numbers. However, they do give the relative seasonal variations if we will make allowance for the delays due to the fact that some of the diseases run a more lengthy course than others.

We have several diseases which we believe are almost entirely inhalation infections,—bad air diseases,—and these have an unmistakable seasonal variation in prevalence. We have them when we house ourselves up and do not dilute our living air by free interchange with the outdoors in winter.

In the first two charts are depicted the number of deaths from influenza and pneumonia by months, each typical in-

halation infections. The pneumonia chart (1) shows a maximum number of cases dying in February, and a minimum in July, August and September, the rise and fall being exactly proportional between these points. The influenza (2) shows the maximum in March and minimum in July, August, September and October. The delay no doubt is accounted for in the different courses the two diseases run after exposure, the latter having a slower onset, longer course, and causing a broncho-pneumonia or other complication which in turn runs its course before death occurs. The ordinary pneumonia is faster.

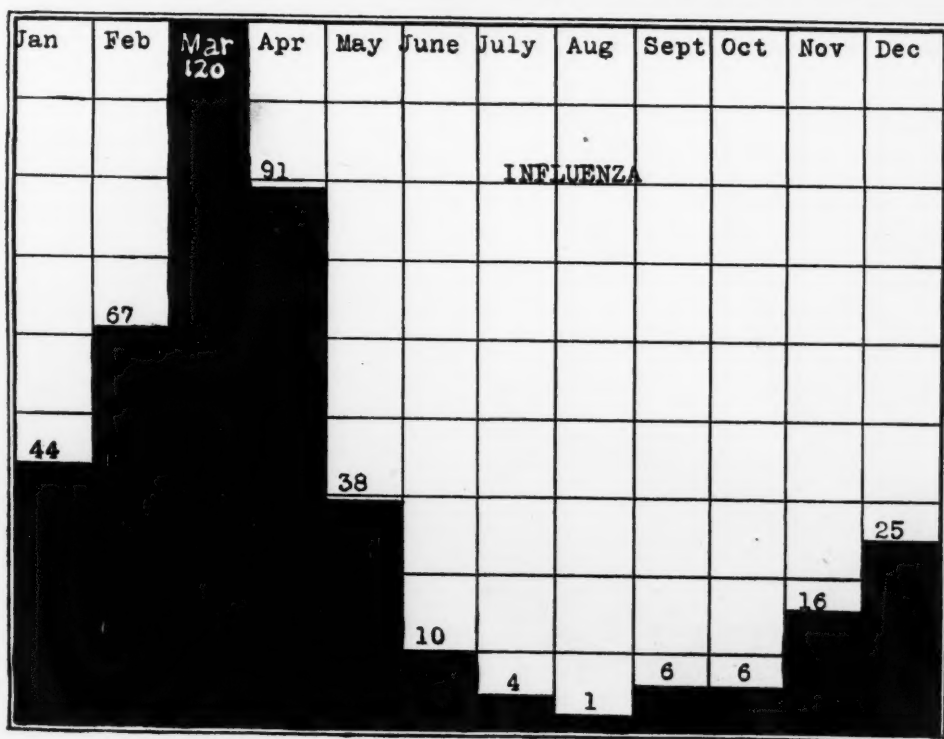
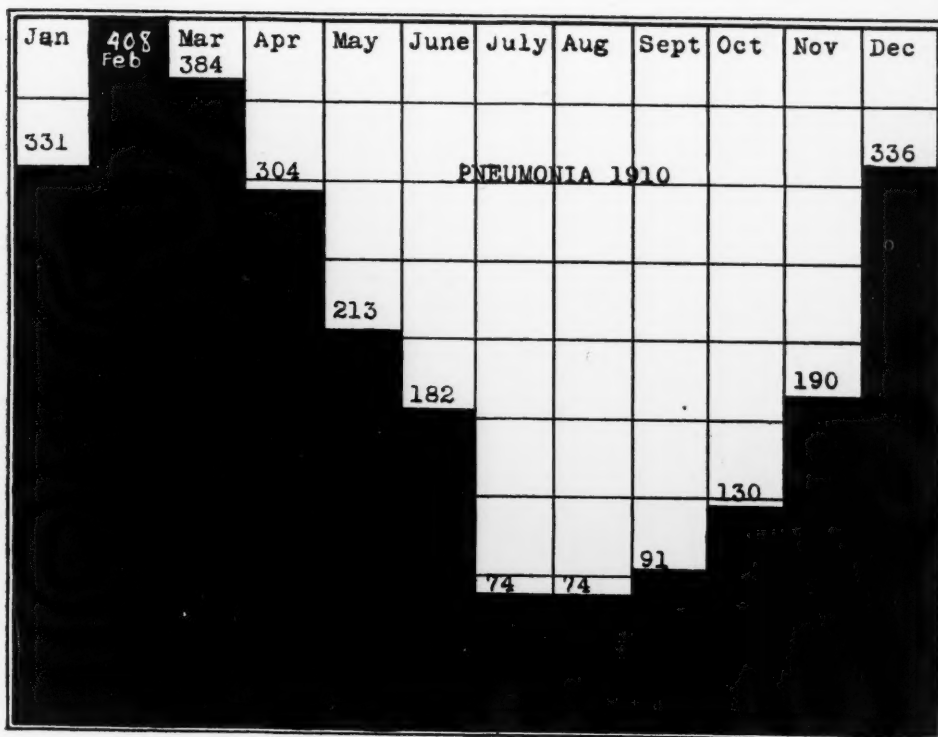
The two next charts, scarlet fever (3) and measles (4), are also typical charts of inhalation diseases, but they vary from the two given because they occur mostly in children, and the indoor exposure is modified by the school months, the contact of large numbers, and possibly other factors. They are lowest in warm weather and vacation time, and highest in cold weather. They are both inhalation infections of children, and we would expect that poliomyelitis would give a similar seasonal variation if it were in the habit of entering its victims through the respiratory tract.

Epidemic cerebro-spinal meningitis prevails mostly in the colder months, and would probably give a similar chart. I have no figures for one, however, as we have had no epidemic of it recently in this State.

Whooping cough gives a chart (5) much like measles in its course, but has not such marked monthly variations, no doubt because of the long course it runs and the overlapping that ensues.

Diphtheria (6) does not show in Michigan any very marked seasonal variation in its prevalence, but is a little more frequent in the fall months.

Typhoid fever exists in fair numbers the



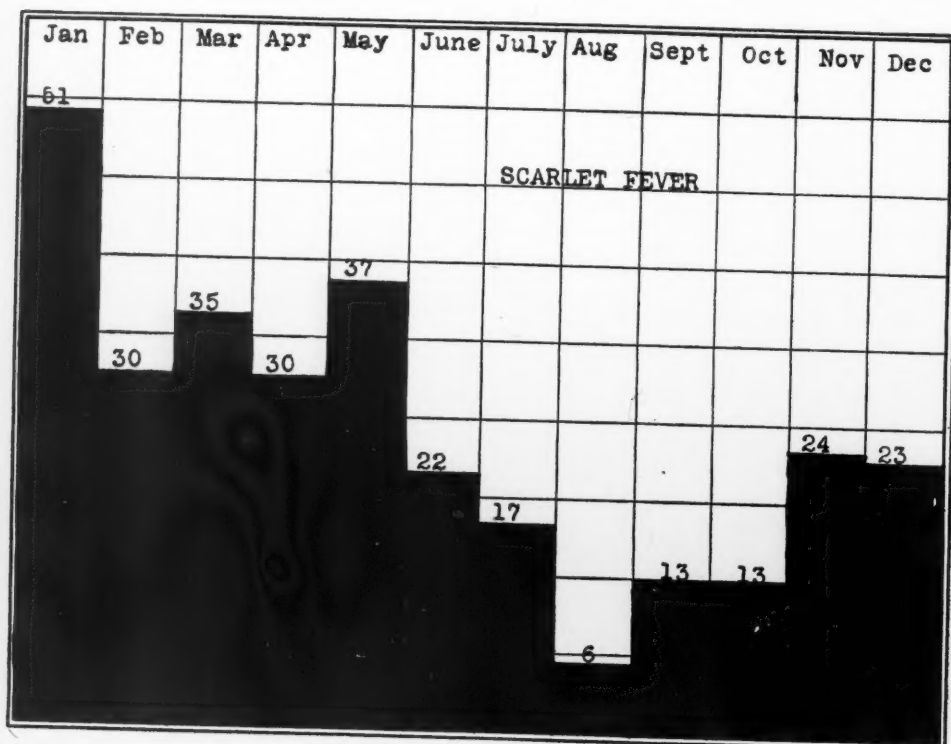


Fig. 3.

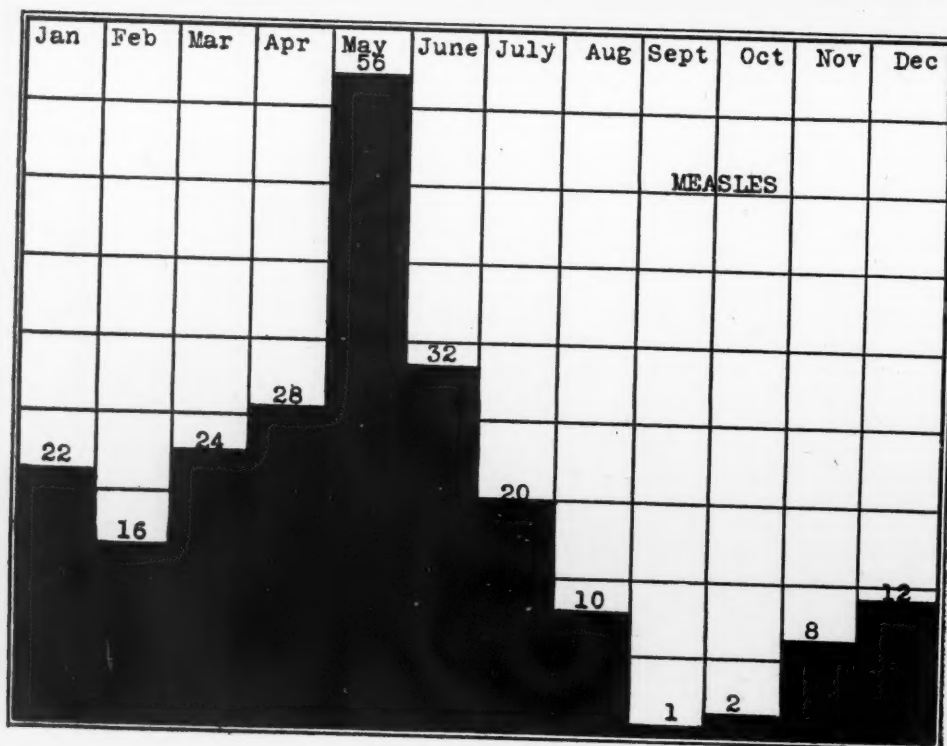


Fig. 4.



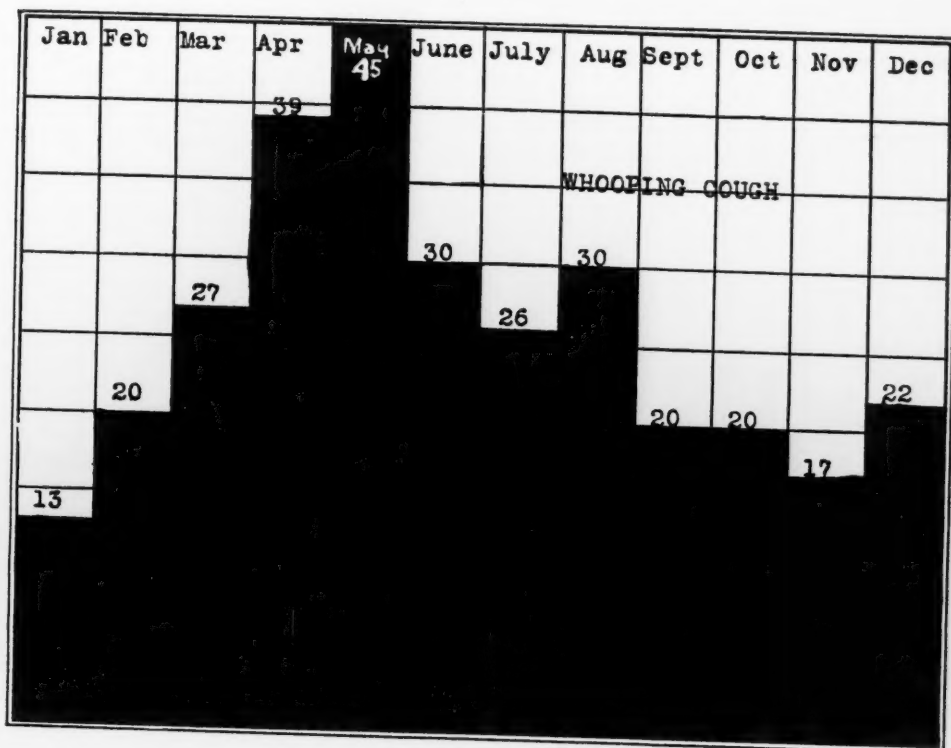


Fig. 5.

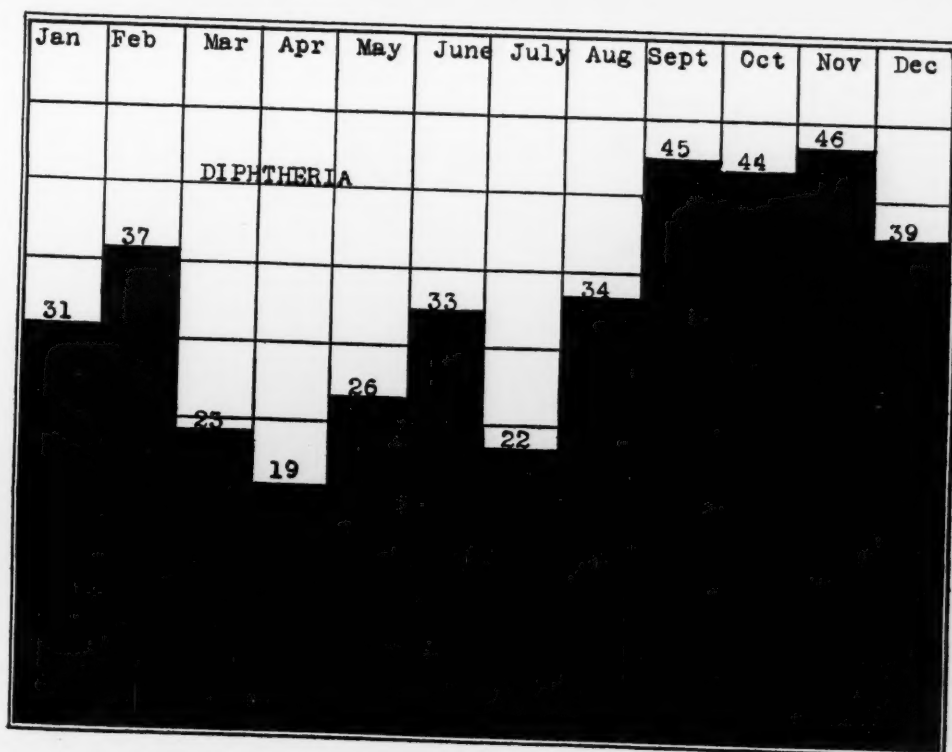


Fig. 6.

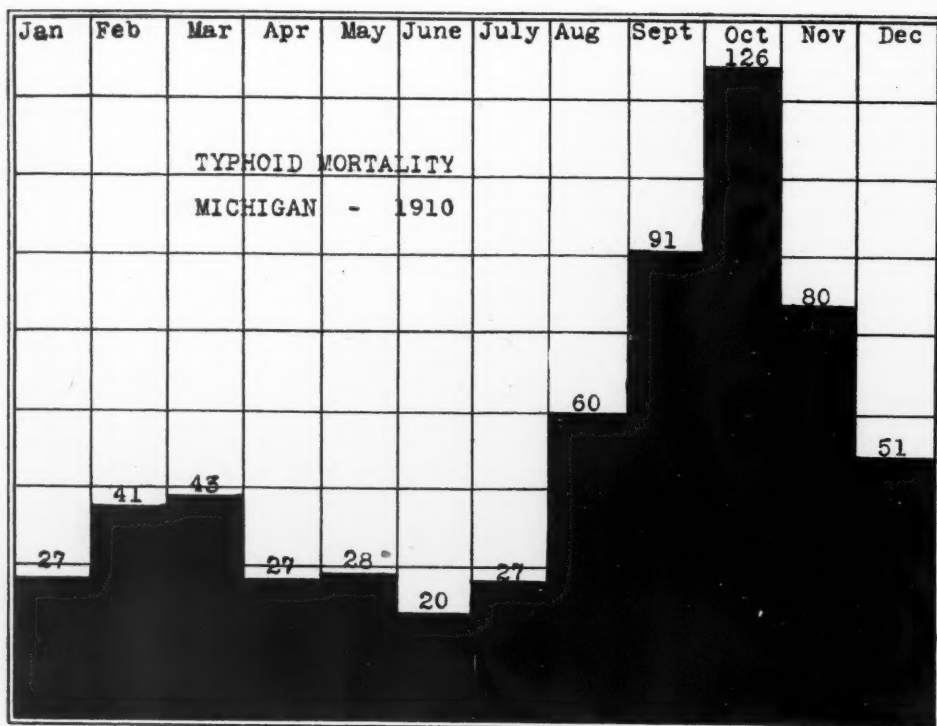


Fig. 7.

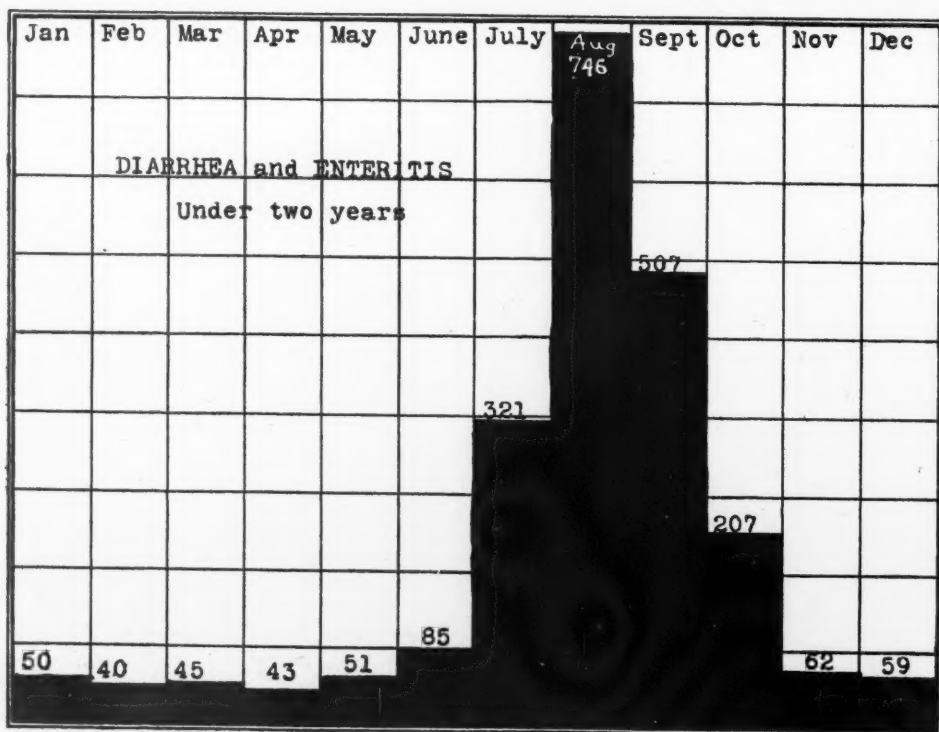
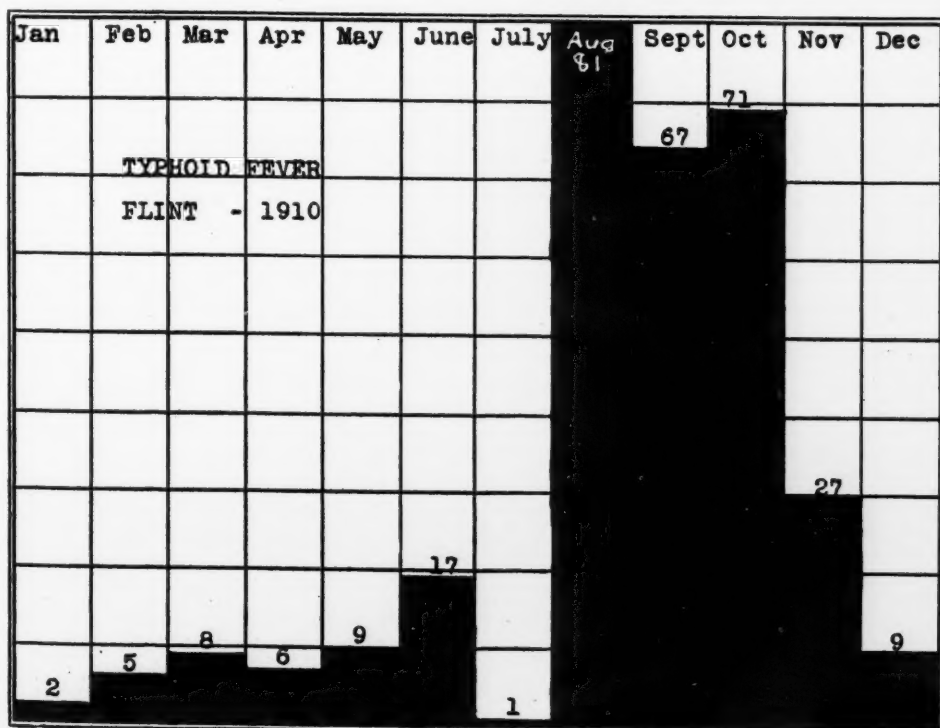
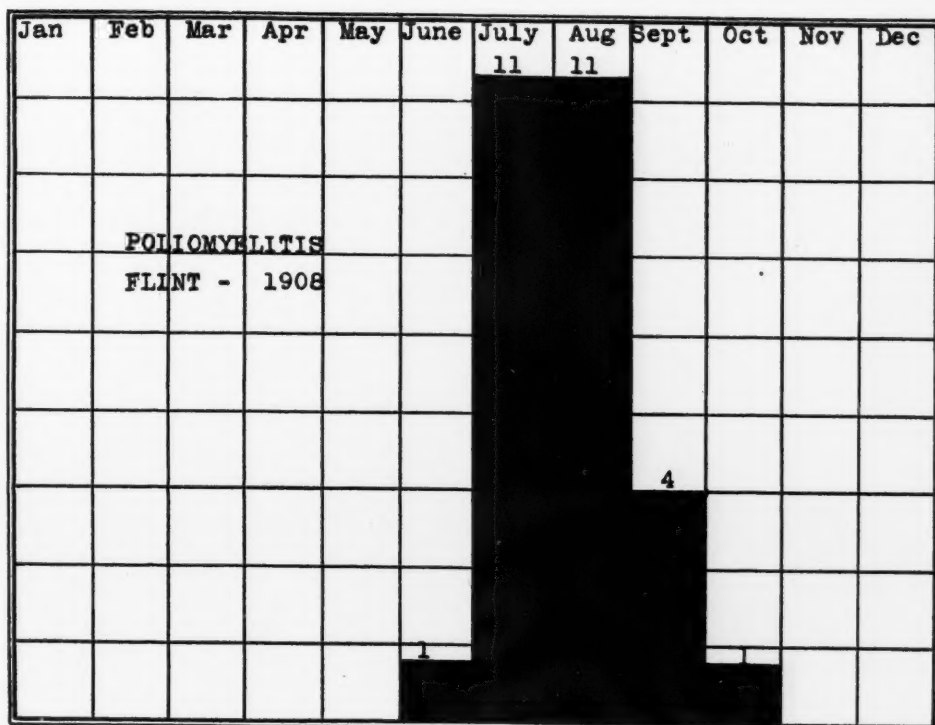


Fig. 8.



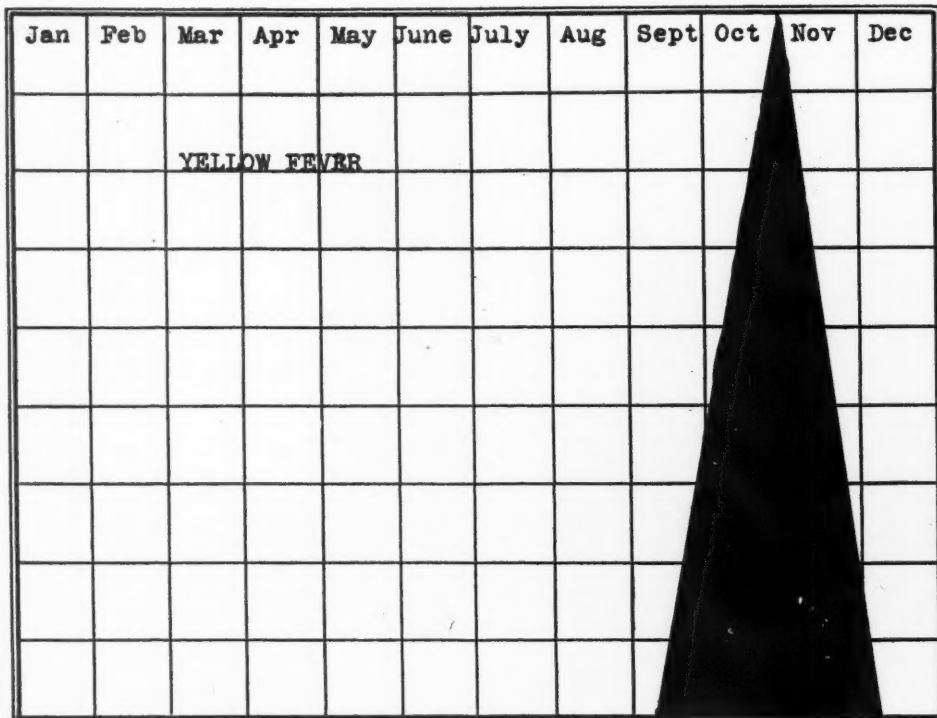


Fig. 11.

year around; however, it has a great rise in summer and early fall, as is shown by the chart (7) giving the mortality in this State in 1910.

The diarrheas of children show a striking scale with its maximum in August (8).

Not finding figures for poliomyelitis by months, I constructed a chart (9) giving the cases we had in an epidemic here in 1908 which I reported in the State JOURNAL. This may be used for comparison, but because of the few numbers it does not give a good staircase rise and fall, as one would get from a larger epidemic. All observers report the same seasonal type of variation, so that no mistake can occur in such a chart.

This chart for infantile paralysis is an exact counterpart of the ones for typhoid and summer diarrheas. It is unmistakably of the same type, and should arouse a strong presumption that some factor of the transmission, modified by the season, was common to all of them.

Typhoid fever and the infectious diarrheas are both food infections, and the spread of the diseases is due to the contamination of food or drink by some agents which transmit the germs to them.

In typhoid, barring the epidemics due to contamination of municipal water supplies, the infection is due to seepage from privies, to shallow wells, and from the fly and his dirty habits; that domestic pet born in the privy and raised in the pantry. I believe it is becoming recognized that the typhoid fever which is found in the outskirts of our cities, and in the villages and country districts, can be largely designated by a simple hyphenated word as a privy-fly-food-infection. The chart of such a local epidemic is shown here (10).

In Flint we have had a most remarkable increase in growth in the past four years, and our municipal improvements have not kept pace with it, so that much of the newer portions of the city has no sewer nor water connections. In 1910 we had ty-

phoid cases to the number of 303 cases; in August, September, October and November there were 246 cases. Of these cases 16 were probably due to a milk infection from one dairy, 37 were in the region of the city where they might be due to the water supply, and the rest were in the unimproved regions where wells and closets are a necessity. In investigating these a very few were traced to wells probably, but the majority were of unknown cause, excepting that everything pointed to the carrying of the germs by flies. There were great numbers of them, the houses were filled with them, and the unscreened, poorly kept privies were also filled with them. It seems reasonable to conclude that nearly four out of five of our cases were due to the flies. The chart of this epidemic is a good one to show a fly infection with its variations by months.

The distribution of typhoid and poliomyelitis show a close resemblance. In fact, the facts given above as known about the latter fit the former very well excepting for the last paragraph concerning the specific organism.

The acute enteritis of children we possibly do not know so much about as we do typhoid. No doubt many of the cases are specifically due the Shiga bacillus. And most all of them are probably due to micro-organisms related to the typhoid germ, the Shiga bacillus, or the colon germ.

This means that the disease only occurs when the food, usually milk, is infected with germs which will cause the disease, and so far as we now know the greatest source for such germs is in the excretions. This brings it back to the typhoid type. The transferring and inoculation of the milk with a pathogenic germ is carried on by some agents which may be again largely the fly. This we are not so sure of, but it certainly looks reasonable.

The influences of the summer and fall

can, after all, be but two in number: to keep the food at a favorable temperature for the germs introduced to grow, and to furnish many insects to carry them about. Other factors other seasons have also. The transmission of the disease is dependent on that which has contact with the dejections of one alimentary canal and the food which enters another. Of typhoid we know the summer variation is largely due to flies, and of the diarrheas we can well suspect it.

In looking over other infectious diseases which have a marked seasonal increase of the summer-fall type, malaria, yellow fever, rocky mountain spotted fever are about the only ones found which in this country in the temperate zone can be utilized for comparison.

Not having particular statistics of these, we can prepare a chart which will show the type by the fact that in the Southern United States yellow fever used to occur from September to December, with its maximum in late September and October. With this as a basis for comparison, the chart (11) is constructed, and it is of the same type we are discussing.

All of these diseases with the marked summer and fall increase we know to be due to various organisms, but they have one thing in common, and that is the virus is carried by insects. Some of them have other methods of spread also, but the summer-fall rise is due to that portion of the cases so infected. We may with great assurance assume that poliomyelitis has its seasonal prevalence in the warm weather because it is insect borne, and likewise we must very strongly doubt that those investigators who are inclined to believe that it is an inhalation infection are right.

This is necessarily a very brief consideration of the factors bearing upon the transmission of infectious diseases, but they are so well known it seems hardly necessary to



discuss them at length to bring out the point I would emphasize, and that is that from what we know of other diseases and their natural history and modes of spread, and from what we know of epidemic poliomyelitis, we must, if we respect the striking facts noticed in the comparison, assume

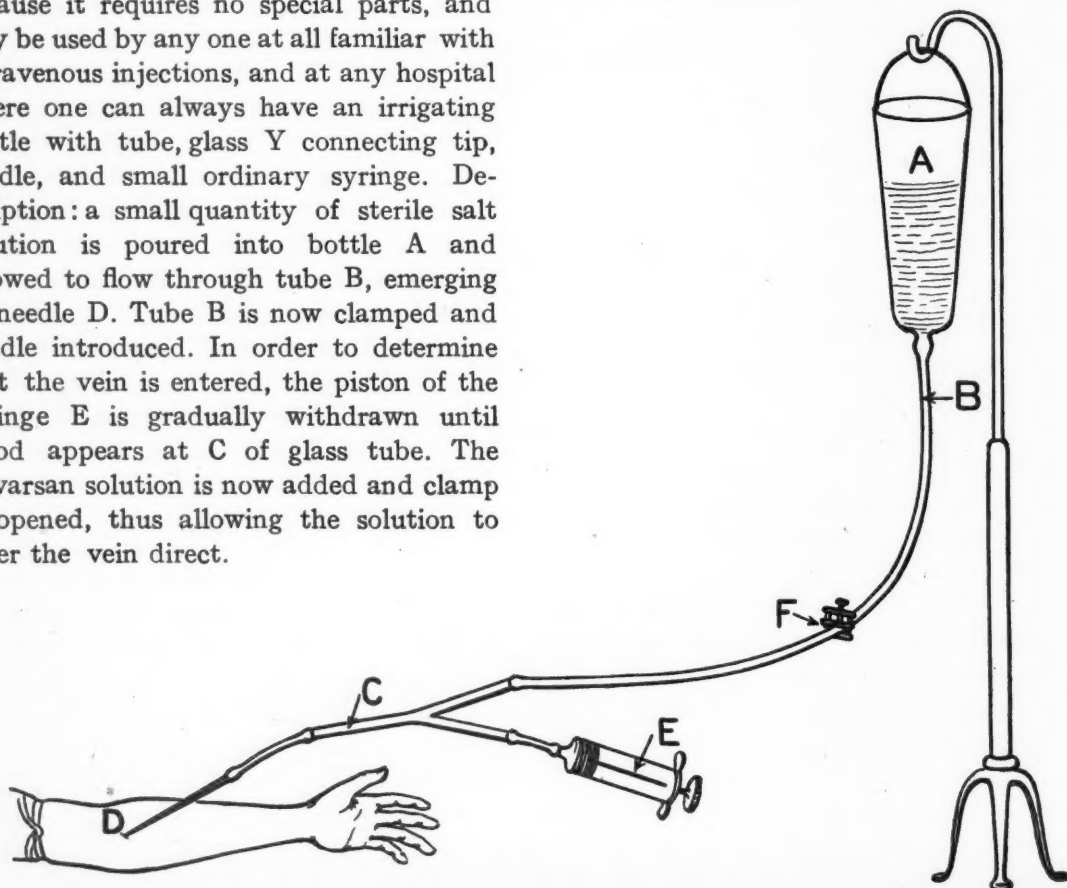
that the latter is an insect borne disease.

I purposely gave several charts of infections which we know to be spread by the entrance of the infectious material into the respiratory tract, and in no way do they show a resemblance to epidemic infantile paralysis.

## A SIMPLE METHOD FOR THE INTRAVENOUS ADMINISTRATION OF "606"

J. JACQUES FABIAN, M. D.  
Grand Rapids, Mich.

Since Ehrlich has advised the intravenous route for salvarsan, innumerable methods and apparatus have been suggested, many of which, no doubt, are good, but all lacking more or less simplicity or efficiency. The following has appealed to the writer because it requires no special parts, and may be used by any one at all familiar with intravenous injections, and at any hospital where one can always have an irrigating bottle with tube, glass Y connecting tip, needle, and small ordinary syringe. Description: a small quantity of sterile salt solution is poured into bottle A and allowed to flow through tube B, emerging at needle D. Tube B is now clamped and needle introduced. In order to determine that the vein is entered, the piston of the syringe E is gradually withdrawn until blood appears at C of glass tube. The salvarsan solution is now added and clamp F opened, thus allowing the solution to enter the vein direct.



# GASTRIC AND DUODENAL ULCER: ITS SURGICAL TREATMENT\*

CAN PARTIALLY STAGNANT DUODENAL CONTENTS BE CONSIDERED AN ETIOLOGIC FACTOR?

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Our knowledge of diseases of the stomach can be traced back many decades. As early as 1812 we find in "The Eclectic Repertory," Vol. III, an account of a new method of extracting poisons from the stomach. This account was written twelve years after the method was employed by Phillip S. Physick, M. D., in an accidental case of laudanum poisoning. His patient was an infant, and the instrument he used was a catheter. From this time, i. e., 1800, he continually recommended this procedure in his lectures. Dorsey, his nephew, upon his advice had stomach tubes made in Paris as early as 1803.

The next noteworthy advance in our knowledge of the physiology and pathology of the stomach we must attribute to the physiologist Beaumont. He in 1823 gave the first description of the character of gastric juice, pointed out that the acidity was due to hydrochloric acid, and demonstrated the motility of that organ. On his observations on gastric motility is based most of our present-day knowledge. In 1821 Dr. John C. Cheesman reported a singular case of "ulcerated stomach with perforation and death." The post-mortem showed a perforated ulcer in the anterior wall of the stomach one and one-third inches in diameter with ragged, elevated edges.

Numerous similar reports of gastric ulcers soon followed and gradually medical men awakened to the possibilities of surgical treatment in these cases. Accordingly operations on the stomach were attempted, and in 1881 Woelffer performed the first successful gastroenterostomy. In America, A. B. Atherton was the first to perform a successful operation for a perforated gastric ulcer; at least to him priority is usually given.

At this time, i. e., 1881 to 1885, little confidence was placed upon any operation on the stomach. Nor is this to be wondered at in the face of the enormous death rate, which, even as late as 1885, was about 67%. Today, however, owing to the fact that patients are operated upon earlier and under more favorable circumstances, owing to more careful preparation, strict asepsis, better technique, prevention, or better treatment of shock, this appalling mortality has been materially lessened, so much so that with the average surgeon today it is from 1½ to 3%. To this end the many different kinds of sutures, such as the Cushing, the Halsted, etc., and the various mechanical devices, such as Senns decalcified bone plates, the Murphy button, the McGraw ligature, etc., have been of considerable aid, and although they all are now relegated to the shelves of past history, nevertheless without them gastric surgery of today would be far behind the perfected condition in which we see it.

\*Read at the Forty-fifth Annual Meeting of the Michigan State Medical Society, Bay City, September 28, 29, 1910.

We now ask ourselves in what conditions is an operation on the stomach and especially a gastroenterostomy indicated. Briefly stated these conditions are: organic stenosis of the pylorus or duodenum either from active or healed ulcer, congenital stenosis, perigastritis with adhesions around the pylorus, producing obstructive symptoms, or pain, and too extensive for simple gastrolisis, persistent and painful pylorospasm due to persistent hypochlorhydria, chronic ulcer of any part of the stomach or duodenum which cannot be relieved by rest, diet, and medical means, and carcinoma of the pylorus, too extensive for resection, in which case the gastroenterostomy is only palliative.

As this paper is to deal merely with ulcer and its relation to gastroenterostomy, we will not discuss all the indications for this operation, but confine ourselves to the one condition, "ulcer."

Ulcer of the stomach or duodenum is more common than text-books would have us believe. Of course, if we intend to cling to the old idea and diagnose only those cases as ulcer in which there are present pain, vomiting, and bleeding, then we are obliged to hold that ulcer is rather a rare condition. This triad of symptoms is, however, rarely found in a given case, and then only in those cases where ulcer has existed for a long time. Here, changes in important organs, such as the stomach, liver, and pancreas, have been brought about by persistent infection at work in the ulcerating areas, whether in the stomach or duodenum. In such a case even a correct diagnosis may be futile on account of the irreparable damage that has been done. We must diagnose ulcer before this stage is reached, if we wish to accomplish much by treatment. Biliousness and dyspepsia are names usually given to a train of symptoms which the study of living pathology has taught us to be due to ulcer. In fact, some authors

assert that every patient suffering from persistent symptoms of dyspepsia has or has had a gastric or duodenal ulcer, and his suffering is either due to the actual ulcerating process or to the sequellæ, cicatricial contraction, causing pyloric stenosis or hour-glass contractions, gastric dilatations, perigastric adhesions, etc.

Numerous causes and many diverse and varied opinions have been given to explain the cause of gastric and duodenal ulcer. Thrombosis, injury due to rough food, septic infection, etc., have all been given as etiologic factors. Some consider hypochlorhydria a cause, others the result of ulcer, but even this condition is not constant, as many ulcers exist without an increased amount of hydrochloric acid. A peculiar causative relation exists between burns and scalds and ulcer of the duodenum. Curling, Dupuytren, and Long, as early as 1840 reported cases of ulcer of the duodenum following burns, yet in the great majority of patients with ulcer such a history is not obtainable. When all is said and done, we must still admit that we don't know. However, the most probable cause to us is that gastric and duodenal ulcers are usually septic in origin, and we think oral sepsis the one condition from which it arises.

A striking thing about ulcers is, that when they occur in the duodenum they are always situated in that part of the mucous membrane which normally is in contact with an acid media, i. e., between the opening of the bile and pancreatic ducts and the pylorus. They never occur below or distal to these ducts. This fact caused us to think that bile and pancreatic juice regurgitating into the upper part of the duodenum and stomach might be responsible for the trouble. We can easily see how stagnation and regurgitation of bile can be brought about by any narrowing of the lumen of the gut below the exit of the ducts, or by a condition in which the superior mesentery ex-

erts undue pressure on the transverse part of the duodenum.

Accordingly, we undertook a series of experiments upon dogs in which we caused an intestinal obstruction distal to the bile ducts. (See diagram No. 1.)

Of course all these dogs died, some of peritonitis, others from a cause we could not definitely ascertain. The dogs that died from peritonitis were not included in our experiments. Those that did not show any signs of peritonitis, that is, those whose

as an inevitable result of the manipulation necessary to cause a complete obstruction of the bowel. To avoid this and to allow the animal to live an indefinite period, we next took a series of dogs and made only a partial obstruction just distal to the bile ducts, with the hope that bile and pancreatic juice would become partially stagnant proximal to the partial obstruction. (See Fig. No. 2.)

The dogs of this group all, with the exception of one which died of peritonitis,

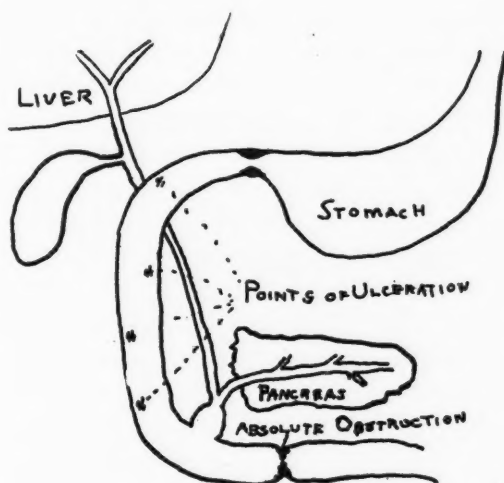


Fig. 1.

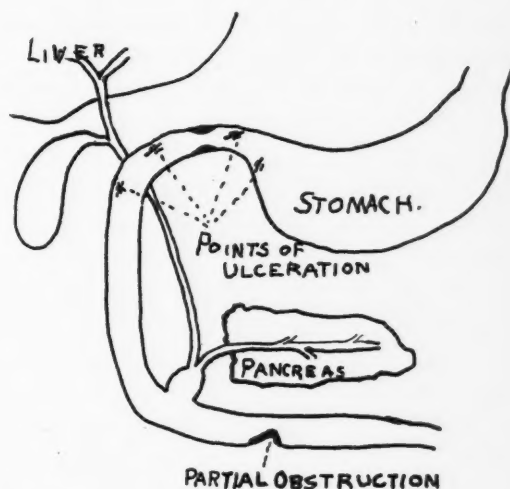


Fig. 2.

peritoneal cavity after death was normal and sterile (as proven by cultures taken immediately after death from the peritoneal cavity), were examined as to ulcerations of the mucous membrane of the stomach and duodenum. In some of these typical ulcers developed, in others there were no such signs.

These experiments were repeated over and over again, but our findings are so inconstant that we do not feel justified in making any conclusions as yet. In fact, we were inclined to believe that those ulcers which did develop were either present before or were brought about by septic material coming in contact with mucous membrane whose circulation was disturbed

lived. These experiments were performed about the middle of June. Since that time the dogs were weighed by-weekly. The weight charts show neither a loss nor gain in weight. Two of these dogs were killed and examined on September 21st, i. e., three months since the operation causing partial obstruction was performed. One of these had areas in the duodenum proximal to the bile ducts, oval in shape, from which the mucous membrane had been cast off. These areas resembled ulcers, except that they did not have the indurated base we usually see in ulcers in this part of the alimentary tract. The other dog's duodenum seemed normal, but the mucous membrane of the stomach in one place on



the fundus, about the size of a half dime, was slightly indurated, reddened and eroded. This spot showed all the signs of a beginning ulcer, and had this animal been allowed to live longer this area would in all probability have developed into a well-defined gastric ulcer. When we find gastric ulcers in the human, the factor which causes their presence must have existed for a period of months and even years. In the case of these dogs, partial obstruction was present only three months, a period of time too short for conclusive evidence. We therefore intend to allow the remaining eight animals of this group to live for about a year, and then see whether the conjectures arrived at from the two animals already killed will be realized. At present we can say, that there is the possibility that partial duodenal obstruction, say from compression on its transverse part by the root of the superior mesentery or from chronic narrowing of the lumen of the gut from some other cause, does cause stagnation of the bile and pancreatic juice, and as a result gastric or duodenal ulcer with a train of symptoms varying from persistent dyspepsia to the well-defined and classical picture of ulcer.

These experiments were made in spite of the fact claimed by many authors that one of the real beneficial results of a gastroenterostomy is due to the alkaline duodenal contents regurgitating into the stomach and there neutralizing or reducing the excessive acidity. If the upper intestinal juices are really beneficent after a gastroenterostomy, as these authors would have us believe, it is difficult to see how they should have been harmful before. However, the experiments along the line above indicated are far from being completed, and even at this early stage they point with strong suspicion to the fact that partially stagnant bile and pancreatic juice in the upper part of the duodenum and stomach is harmful.

The diagnosis of this condition is arrived at principally by a careful anamnesis. The physical examination will reveal little of value; the stomach analysis may show increased acidity, and thus may confirm, but as said before, even absence of hypochlorhydria is not a proof that ulcer does not exist. How, then, can we best arrive at the conclusion that ulcer does exist?

Given a case of recurrent attacks of dyspepsia which will not yield to rest and medical treatment in three or four weeks, in which the epigastric pain is related to food, and in which there is localized or general tenderness, we may at once become suspicious of the presence of ulcer. If added to this we have vomiting which relieves the pain, we may conclude with a fair amount of certainty that an ulcer is present. Blood in the vomit or blood in the stools will of course diagnose the condition with greater certainty, but this is far from necessary in determining the presence of ulcer. We used to call cases of distress and pain in the stomach when empty gastralgia. Gastralgia does probably exist, but in the vast majority of cases it is a symptom where inflammatory change is the definite and underlying cause.

An idea of the lack of alarming symptoms that sometimes accompany ulcers can be arrived at by studying those cases of sudden perforation, which up to the time of the perforation have given practically no signs to warn the patient or physician of their presence. If we review these cases after the operation, we will find that about all the patient had noticed was the frequent appearance of what is known as "hunger pain," which he had found by experience could best be eased by the nibbling of a biscuit or by drinking a glass of milk.

What we wish to impress most emphatically is not to wait for the old classical picture of ulcer. The only way the patho-



logical condition responsible for such a picture could have been arrived at in past years, was on the post-mortem table. At that time abdominal operations were few, and it is easy to understand how such was the case; how only those extreme and severe cases which had actually died as a result of these ulcers or their sequellæ were recognized as ulcer cases. Consequently all literature on this subject was based on these post-mortem findings. Today, with the vast amount of abdominal operations, some only exploratory, we have learned from the surgeon that even in minor degrees of pain and discomfort referred to the stomach, ulcer, as so frequently demonstrated at operations, is at the bottom of the trouble. It is the living pathology of the day and not the dead pathology of the past that should govern our thoughts and actions.

With the diagnosis made, the question is what form of treatment to pursue. Can medical treatment effect a cure or should resort to the knife be had in every case? It is true that dieting, lavage and medication can cure the ulcer for a time. The cicatrix thus formed is, however, not strong and easily breaks down, especially if the factors which in the first place caused the ulcer, again come into play. Moreover, the starvation treatment is very tedious and irksome. To this we must add that over 50% have recurrences. Considering, then, the frequency of recurrences after medical treatment, its unpleasantness, and the gratifying results after surgical treatment, we would advise the latter, recommending excision where possible plus gastroenterostomy.

The permanent cures after operation properly performed are about 90%. The immediate mortality is about 1 to 2%, and in the hands of most surgeons even this is steadily on the decline.

The complications which have always

been dreaded from the operation are infection, vicious circle, hemorrhage, peptic jejunal ulcer, obstruction, due either to adhesions or infolding of the mucous membrane, with contraction of the anastomotic ring and hernia through the slit in the mesentery. All of these, except peptic jejunal ulcer, are ghosts of the past, and even this is so rare that it is really a surgical curiosity. Yet it does remain. Vomiting, evidence of obstruction, is usually due to faulty technique. The danger of hemorrhage from the suture line is no greater than that from any other operation. The field for operation is ideal. The stomach and duodenum have thick walls, are richly supplied with blood, and are the most aseptic part of the alimentary canal.

Vicious circle, vomiting as evidence of obstruction either from kinking of the duodenum or contraction of the anastomotic opening, are readily avoided if proper technique is employed, i. e., the posterior no loop operation, with the opening in the stomach large enough (about two and one-half inches long), and in a slightly oblique direction from left to right and downwards. This oblique direction from left to right is the natural course of the duodenum at the point where the anastomosis is to be made, i. e., about two inches from the ligament of Tritz. Of course the amount of obliquity each individual case will have to decide.

The immediate relief from symptoms after a gastroenterostomy is wonderful. The patients are generally more comfortable the day following a gastroenterostomy than even after an interval appendectomy. Gas pains are the exception. The desire for food returns, and the improvement in the general condition in a few weeks is comparable to the change brought about in a starving man who is given food and drink.\*

57 Fort Street W.

\*All experimental work described in this paper was done in the research laboratories of Parke, Davis & Co.

## DISCUSSION

DEAN LOREE, Ann Arbor.—The mortality in gastroenterostomy should be no more than in appendicitis, but the technique is much more difficult. There is one point in relation to gastroenterostomy that I would like to mention. If one has a chance to view the interior of the peritoneal cavity, some months following the operation, he finds that communication between the stomach and bowel does not exist; in other words, the stomach and intestinal wall have healed separately. This condition I have never seen when there was pyloric obstruction, but is very apt to occur in cases of ulcer of the duodenum without obstruction. This, no doubt, accounts for the recurrence of symptoms in a certain percentage of these cases.

DR. R. E. BALCH, Kalamazoo.—I would like to call the Society's attention to one method of operating upon the results of gastric ulcer that has fallen into disrepute and seems to be practically forgotten. I think Dr. McLean will admit that a large percentage of operations are for dilatation of the stomach from spasm or stricture of the pylorus. It has been shown that in chronic dilatation the greater and lesser curvature prolapses, so that the greater curvature often rests in the true pelvis. If we do a posterior no loop gastroenterostomy, we practically hang the stomach by three points, the esophagus, the pylorus and ligament of Treitz, with the results that the dilated stomach drops forward so that our opening is not low down but high up, and the stomach does not drain. I had several poor results in cases of dilatation where the posterior no loop operation was performed, so I discarded that and adopted the Roux operation, or the Y-anastomosis. In that method we cut the intestine, as you know, entirely in two, anastomose the distal portion to the stomach, and the proximal portion into the distal. You thus get a perfect drainage of the lowest portion of the stomach, and then as the stomach contracts, as it always does after the proper drainage, this distal loop, which is perfectly free, can rise with the stomach, and we have no kinking at any time of the convalescence. The results have been so good that I think that this should be the standard operation in cases where the skiagraph shows the greater curvature resting below the brim of the pelvis.

I should also like to add that I think every case of stomach surgery should be skiographed

before the operation, because it shows what we cannot see at the time of the operation, even with a seven or eight inch incision, and it is not necessary to make such a large incision if you know what you are going to do. It gives us not only the shape and contour of the inside of the stomach, but the exact position of the stomach. I think Dr. McLean will admit that it is exceedingly hard to show the exact shape of the stomach through a laparotomy incision. Also there is no more reason to go through the right rectus for a gastroenterostomy than there is for going through the left for gallstone operation, as in a large majority of the cases the stomach lies to the left of the median line.

DR. C. D. BROOKS, Detroit.—One point of importance in the diagnosis of these cases, before the gastroenterostomy is indicated, is that diagnosis is not possible of benign or malignant obstruction, the cases which have a history of ulcer which is very definite, and mechanical obstructions should not be allowed to go too long before having an exploratory operation. By that I do not mean to find out if something is the matter, but to find out if the condition can be relieved. Surgical men believe in this. We have had about eighteen or twenty cases of carcinoma in the last two years which were so far advanced that it was impossible to remove them, but necessary to do gastroenterostomy to relieve the symptoms of mechanical obstruction. It seems too bad that these cases cannot be diagnosed sooner. They usually have mechanical obstruction for two or three months to a year before the operation is recommended. Patients are often to blame, as they often wish to wait a few months after operation is recommended.

DR. MCLEAN (closing discussion).—As the doctor has mentioned, there are so many of these cases. I think possibly that gastroenterostomies have sometimes been done when there is no ulcer present. I don't think it should be done unless there is positive evidence of the ulcer demonstrable to the naked eye. I think possibly when you see there are no cures, or the patients are no better, in fact, it is where the ulcer has not been positively demonstrated.

As to the drainage of the lower portion there, of course this shows the open stomach, this the posterior wall, and this the opening there about the lowest point. We are not so particular; we

try to get the lowest point, but are not particular where it is. In regard to what the doctor said, that you don't have to have your incision through the right rectus, or any particular place, in the median line I think is about as good a place as any, and for all cases it is probably the most conven-

ient and easy there to pick up the duodenum, but when these cases are done with care to warrant or justify gastroenterostomy, I think the result is ideal, and we might say they are almost safe.

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## PRACTICAL POINTS ON FRACTURES

(Fuld in *International Journal of Surgery*)

With a history of a trivial injury, followed by a fracture, such as stubbing the toes in falling, or sudden turning over in bed, always think of pathological fracture. An X-ray picture may reveal a tumor, which may be a sarcoma, secondary carcinoma, gumma, cyst of bone, etc. These cases are frequently of medico-legal interest.

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Always have a physician or nurse assist you in reducing and setting a fracture, who will share the responsibility and act as witness should suit be brought against you. If necessary call in a consultant. Always give a guarded prognosis.

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In fractures of the nasal septum, the interior of the nose should be inspected frequently after replacement of the fragments, as the hematoma, which generally follows the injury, often becomes infected and must be opened early.

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In fracture of the spine and of the pelvic bones, it is important to catheterize the patient at regular intervals. In the latter condition this will aid in the diagnosis of rupture of the bladder, which is shown by the presence of blood or bloody urine. If necessary the bladder should be irrigated.

Leave instructions that should a fractured limb become swollen, bluish, or very painful, you be notified at once; and always respond to the call or send some one in your place. If there is much swelling, cut the plaster cast or loosen the dressing and reapply it firmly.

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In doubtful cases of fracture of the base of the skull, a lumbar puncture showing bloody fluid will give conclusive proof of its existence.

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Bleeding from the nose and ear following head injuries does not, necessarily, mean fracture at the base of the skull. The hemorrhage may come from an abrasion of the auditory canal or the mucous membrane of the nose.

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There are many cases of sprained, weak, rheumatic wrists that are instances of unrecognized fractures of the scaphoid bones. The Y-ray will reveal the true nature of the lesion.

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Temporary splints may be improvised from all varieties of articles and materials,—umbrellas, walking-sticks, golf clubs, broomsticks, newspapers rolled up into narrow bands, old band-boxes, bed-slats, cigar boxes.

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The Forty-sixth Annual Meeting of the Michigan State Medical Society will be held in Detroit September 27-28, 1911

## CANCER\*

F. A. HARGRAVE, M. D.  
Palo, Mich.

In collecting the subject matter which I now submit for your consideration, it has been my aim to include nothing but such as would appeal directly, and almost personally, to the general practitioner, for he it is who is generally consulted first, and has an opportunity to examine and advise in the incipient stage.

The importance of a thorough study of all that relates to the subject of cancer appeals to us *first* from the fact of its frequency and the high death rate which it entails.

From a late *Quarterly Report, Michigan*, we quote: "In the State of Michigan, cancer is the cause of 5% of all deaths. With the exception of heart-disease, tuberculosis, and pneumonia, cancer kills more people than any other factor."

Cancer is of most importance to men and women between the ages of thirty-five and seventy-nine, which is called the cancerous age. During the cancerous age, out of every fifteen men who die, one dies of cancer, and out of every eight women who die one dies of cancer.

Three times as many men as women die from cancer of the mouth, two and a half times as many men as women die from cancer of the skin, and forty-eight times as many women as men die from cancer of the breast.

Cancer of the stomach and liver are the most prevalent forms in this State, with cancer of the uterus and of the breast following next in order of frequency.

All reliable statistics go to prove that there is a universal increase in cancer mortality. In England, the Report of the Registrar General in 1908 shows that one man in eleven, over thirty-five years of age, will die of cancer, and that one woman in eight over the same age will die of cancer.

Admitting the above figures as correct, and apply the same estimate on the population of the United States, we must now have in this country not less than ninety thousand cases of cancer that will prove fatal.

In the second place, its importance must appeal to us as medical men, in relation to our duties and responsibilities in the premises. In view of its frequency, and the vital importance attached to early diagnosis and early and thorough treatment, there can be few if any instances where our duties and responsibilities are greater.

A deep-seated abscess, not discovered and consequently neglected, often clears away through a drainage not made by surgeons, and the patient survives to remind his doctor in later years of an error in diagnosis.

An attack of appendicitis may have been mistaken for a diseased ovary or some other affliction, and in time an abscess develops; by a slow process of sloughing a drainage is established, the abscess contents get to the surface, and the patient gets well and enjoys a long and happy life.

An attack of acute periosteitis may be mistaken for rheumatism, and the mistake not recognized till too late for anything of

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January 12, 1911.



avail short of an operation for caries, and often this is an amputation, and again we see our patient live and act well his part in life with an artificial limb.

Not so with cancer. Admitting the possibility of self limitation of an occasional case, this associated fact must be conceded: that in cases left to run their natural course the tendency in nearly every one is from bad to worse, terminating in death.

Next, its importance must appeal to us from the horrible and long-continued suffering the patient must endure who dies of cancer, and, lastly, from the obnoxious surroundings and unpleasant tasks which devolve upon the family, the nurse and the physician, whose duty it is to minister to the needs of these hopeless cases as they travel slowly but surely down the straight road to death.

It is not my purpose to enter into the details of the subject such as relates to the classification of cancers, based on the findings of clinical, histological or pathological research work. For a full comprehension of this, you are referred to the standard text-books of the day, wherein you can find the subject-matter presented in a more interesting manner and with much more detail than I am able to give.

Too much emphasis can not be placed on the responsibilities of the general practitioner as it relates to his vigilance in an effort to make an early diagnosis, and his promptness in resorting to early and thorough treatment, for he it is who gets closest in touch with the masses of the people in the early stage of this, and all their other ills.

The fact that the family physician is not much concerned over the appearance of a seemingly harmless growth, is generally sufficient to put at ease a feeling of suspicion on the part of his patient, and oftentimes till a life has been jeopardized.

Causation: It is when we consider the

rank cancer holds numerically in the list of diseases, and the importance causation sustains to treatment, that we can comprehend the value of positive findings as to the actual cause.

Various theories have been advanced, much has been written and considerable research work done, especially during the last ten years, in endeavors to determine the causation of cancers, their nature and process of development, and with all we still seem to be in a flurry of speculation.

The belief in a parasite of some kind as the cause of cancer has been widely held for a considerable length of time, and the search for such an organism has been carried on with much intensity in laboratories all over the world.

Perhaps no one person has done more valuable work in this particular field than Dr. Wm. Bosenquet, of London, who has followed a plan systematically arranged on lines of analogy. Using data positively determined in other diseases, such as tuberculosis, typhoid fever, etc., he makes a comparative study with what is known of parasites, associated enzymes, etc., in these diseases, and then by a systematic comparison proceeds to support or disprove the probability of a specific yet undiscovered parasite as the causation of cancer. His contribution to the literature of the subject, though interesting, is too elaborate to quote in anything like detail, but when his final conclusions are given he offers little or no evidence in support of a parasitic origin of cancer.

In 1904 Dr. H. R. Gaylord reported a series of observations which he believed determines the cause of cancer. The studies cover three years' work in the New York State pathological laboratory of the University of Buffalo. In all the cases of cancer which he examined he was able to separate organisms which resembled fat in the free state. The ether and osmic acid



test showed, however, that they were not fat particles. Animals into whose abdominal cavities they were injected developed peritonitis in the majority of cases, and from the peritoneal fluid large numbers of these bodies were obtained. According to Gaylord, they can be found, if properly sought for, in every cancer, and may be injected into animals and subsequently recovered.

Continuing his report, he gives data derived from his clinical findings. This, though interesting, is too lengthy to be considered in this connection. At present it is safe to say that his findings are not generally accepted by the profession as a solution to the problem.

From Charles E. De M. Sajous, we have the following: "Cancer is primarily due to hypoactivity of the body's auto-protective mechanism, the adrenal system, the result, in turn, in most cases, of premature senility. It is a vicarious overgrowth of tissue cells which the agents of this system, leucocytic and humoral, should have destroyed in its incipency; i. e., when but a nidus of proliferating cells, formed as a result of local irritation by traumatism, inflammatory foci, parasites, moles, warts, etc.

"The defensive agents, phagocytes and autoantitoxin, being those which, under normal conditions, carry on general nutrition, they are able only, owing to their insufficiency, to nourish the tumor and promote its development."

This definition, which differs radically from those previously adduced by others, opens up a new line of thought in this connection, and affords a theory on which to base exalted hopes for the efficacy of internal medication in the cure of cancers.

Giving full credit to all the theories advanced for the evidence each one has brought forth in an effort to establish positive findings that are necessary to ex-

plain scientifically the cause of cancer, we yet fall short in proven facts.

Notwithstanding the seeming state of chaos in which the many able investigators have left us as to the solution of the causation of cancer, we think that we have reason to believe that enough has been brought out to make clear many disputed points, and make it possible to arrive, in the near future, at conclusions that will place us in a position beyond the pales of reasonable doubt.

To some it may seem like begging the question, but I believe it must be accepted as a fact, that when the broad distinction between the epithelium and connective tissue type of tumors was established by Professor Virchow, he blazed the way to the goal where the mystery will be unlocked.

From the nature of cancers, it is rendered almost certain that they probably never originate except in connection with epithelium cells, i. e., in the skin, mucous and serous membranes lining cavities and ducts of secreting and excreting glands.

Extending our inquiry on lines of analogy and borrowing from well-established facts relating to cell development in the science of botany, and with these facts associate the recognized favorable results obtained from internal medication directed to the antidoting in and removing from the system the toxins generated in the process of metamorphosis into cancer cells, and we have a basis, at least, for the theory that cancers are neoplasms originating in a semi-destructive metamorphosis of epithelial cells in their very early stage of development, due to environment and generally to traumatism.

We all recognize the achievements of the great Western wizard, Mr. Burpee, in transforming plant development so as to produce a new species of shrubbery, a new variety of fruit, or a seedless fruit of the same variety. While he chooses to keep

the details of his process a secret, enough about it is known to tell us that his marvelous results are brought about by some changes bearing directly on the cell development of the plant in the embryonic stage.

The metamorphosed epithelium cell, or cancer cell, as we choose to call it, is endowed with certain inherent properties, not yet fully understood. That they are of a lower type and with less vitality seems quite probable.

Their ability to bring about a retrograde change in other cells lying in juxtaposition with them, though not understood, is quite probably due to the presence of a toxine created in the process of lowering cell vitality.

The distribution of cancer cells by a process known as metastasis through lymphatic ducts finding lodgment in neighboring lymphatic glands, thus establishing a secondary nidus, is quite well understood, and research work has demonstrated this characteristic feature: that whereas in most infective diseases, especially in tuberculosis, there is a multiplication of connective tissue cells present, forming what are known as nodules, wherever the bacilli settle, due to an inflammation excited by an enzyme the tendency of which, as in all inflammations, is to arrest the invading organisms and repair the damage done.

In the case of cancer, on the other hand, the secondary nodules are formed by the growth of actual cells, carried away from the original tumor, which are implanted as emboli in the distant tissues and develop the nodules, not to any great extent, by the multiplication of connective tissue cells, but mainly by the multiplication of the cancer cell.

As further evidence in support of the probable correctness of this theory of causation, we refer to the usual site of origin.

We have all noticed the frequency of epithelioma on the lips, quite likely due to abnormal pressure from a pipe stem or a tooth out of line; cancer of the cervix, probably due to the cicatrix of a laceration; cancer of the breast, in all probability due to scar tissue following an abscess, and cancer of the stomach, the sequel of an ulcer in the lining of that organ. In every instance we recognize a condition predisposed to the development of just such a change as we so frequently encounter.

This leads to the question, must heredity be considered a factor in the causation of cancer? To this I answer no, if asked whether a cancer cell or cancer as a disease is inherited, but if asked if a predisposition to cancer is inherited, I answer yes. The prominent and irregular front teeth, the thin, rough and patchy skin which we so often see as traits passed down from parents to children, are fair examples of an inherited predisposition to cancer, but in these inherited traits we have no evidence of an inheritance of the actual disease.

There will always be a high percentage of cases in which a sufficiently early diagnosis, to head off metastasis, can not be made, and on this account we must look for a high mortality rate, despite all justifiable vigilance. Especially is this the case in cancer of the breast and those of the internal organs.

Admitting or rejecting, as we will, the correctness of any theory, the facts remain the same: harmless-appearing growths and conditions *do* develop into cancers, and they in turn give us the astounding death record quoted in the outset.

The questions, then, that come to us as medical men, are these: to what extent are we responsible for this high death rate and to what extent are we going to exert our abilities to reduce it?

## ACUTE MASTOIDITIS\*

CALVIN R. ELWOOD, M. D.

Menominee, Mich.

The modern mastoid operation, like many other surgical procedures, was originally attempted with a mistaken idea of the pathology, with imperfect technic, and with results accordingly unsatisfactory. Riolan first opened the mastoid in the middle of the seventeenth century for the relief of intractable deafness with tinnitus, the result of closure of the eustachian canal, believing that by so doing he would restore the atmospheric pressure in the middle ear and relieve the symptoms. Hess, a Prussian army surgeon, also attempted the operation for a similar purpose, and the procedure is known in otologic literature as the Hess operation. It was not until twenty years later that Petet, a French surgeon, grasped the general idea of the pathology of mastoiditis, opened the cells for caries and cured his patient. The imperfect knowledge of the pathology and anatomy of the ear produced a great variety of indications for the mastoid operation, with correspondingly uncertain results, which brought about the dark ages in otologic literature, and for over half a century the ear was left severely alone.

In the middle of the nineteenth century Willis Wilde, of England, the author of Wilde's incision, presented what was up to that time the most comprehensive idea of the pathology of mastoiditis. His operation, which consists in an incision down to, and if possible through, the periosteum over the mastoid, was generally believed to be the last

step in the treatment of suppurative mastoiditis. The otologists of that day believed as Wilde taught, that opening of the mastoid cortex should be attempted only when the patient was *in extremis*, and even then with great reluctance, the step being regarded in the majority of cases as contributing simply to precipitate the fatal termination. We now believe that where Wilde's incision is indicated a mastoid operation is imperative, and it is therefore very seldom employed. It was not until 1864 that A. B. Crosby, an American, had the temerity to again open the mastoid cortex for purposes of drainage, and this he did with an ordinary gimlet with a good result. His triumph led to the development of the operation with the mastoid drill, which was the operation of choice up to the epoch-making discoveries of Schwartz in 1873, and which was taught and practised by many as late as 1885. The Schwartz operation with relatively insignificant refinements constitutes our present technic.

The etiology of suppuration of this peculiar cellular bony structure in a large majority of cases is an extension through the aditus ad antrum of a suppurative process in the middle ear, and if the middle ear disease is a complication of la grippe, scarlatina, or measles, there is much more danger of such extension.

A physical examination of the cellular osseous structure can not determine its vitality. In other words it is impossible by macroscopic examination to determine whether some cells of the mastoid will

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subsequently break down and others will not. The only safe course, therefore, is the complete removal of all mastoid cells whenever the cortex has to be opened for suppurative inflammation.

The muco periosteum which lines and nourishes the middle ear and antrum performs the same gracious service to the most remote cells of the mastoid, and while this is a most natural and highly beneficial arrangement in health, it exposes this cellular structure to infective invasion under circumstances admirably adapted for the rapid and extensive destruction of tissue. That every severe case of middle ear suppuration does not result in mastoid infection is doubtless due to the inflammatory edema of the muco periosteum which acts as a barrier to the passage of infection through the aditus, unless the infective process be very active or the resistance of the individual below par.

While clinical experience teaches that by far the most frequent method of infection of the mastoid cells is along the muco periosteum from the middle ear, there are occasional cases of metastatic infection. I have a patient at the hospital who presents an exceedingly interesting phase of the pathology. Her hearing is good, she has never had any middle ear disturbance of any consequence, and still I operated her for mastoid empyema which has pursued a most obstinate course in its repair. Another surgeon has also operated her for a pelvic abscess of long duration. In the absence of middle ear inflammation is it not reasonable to suspect the mastoid disease to be of this type? After thorough drainage and faithful after treatment had given disappointing results, this patient is recovering under the hyperemic treatment of Bier and the mixed streptococcus vaccines.

The recognition of the necessity for the modern mastoid operation is universal

and enthusiastic, but as regards the indications that shall determine the expediency of immediate operation or the wisdom of pursuing temporizing measures of aborting the inflammatory process, there is perhaps no consideration in the whole field of otology about which there is more diversity of opinion. The attitude of the enthusiast who urges an exploratory mastoid operation whenever in acute suppurative otitis mastoid tenderness persists for twenty-four hours, finds its direct antithesis in the position of the practitioner who is not convinced of the necessity for operation until fluctuation can be readily felt over the mastoid region, and when evidences of sepsis are disgustingly plain.

It is manifestly impossible to harmonize opinions so widely at variance. Still such extravagant extremes find such zealous support that the doctor in trouble is often at a loss to know what course to follow, and the more he investigates the greater may be his uncertainty. It will be my endeavor to avoid either extreme—calling particular attention to the symptoms that have been of most value to me, although I wish to emphasize the fact that the necessity for surgical interference will often be found upon opening the mastoid to be far greater than the severity of the symptoms would suggest. First as regards personal history: pain which is described as a deep boring pain, or a sickening exhausting pain that grows worse at night, and especially if persistent in the mastoid region, must be considered strongly suspicious. If the discharge from the middle ear is excessive in amount or persists for more than a week, there is usually not good tympanic drainage, and if it suddenly diminishes coincident with the development of mastoid pain and tenderness, the case is one to be watched with great care. The temperature, pulse, and respiration are comparatively insignificant symptoms. They may be but



little increased or they may be markedly so. There is usually some indisposition to prolonged exertion, although the patient can hardly be considered sick. Chill, vertigo, vomiting, profuse perspiration and prostration are not symptoms of mastoid infection, but are indicative of intracranial complications. With children, as would be expected, the above manifestations are usually exaggerated.

As regards the local manifestations: the face shows the usual physiognomy of pain and deafness, but is otherwise not significant. Facial paralysis is an occasional symptom, but one which I have seen only once. The mastoid region is usually negative on inspection except later in the disease, when with the formation of a subperiosteal abscess, there is swelling in that region with crowding forward of the auricle. Examination of the external auditory meatus will show a discharge either copious or scanty. If it is less than before, and its diminution is associated with an increase of pain and mastoid tenderness, or if the discharge has been very profuse for a long period of time, it is a symptom of much significance. There may be in obscure cases, as the one I have mentioned, a mastoid empyema without any suppurative otitis media, but these are very rare indeed. The drum membrane may or may not be bulging, and if bulging is most significant if the most prominent portion is Schrapnell's membrane, which constitutes the upper portion of the ear drum. If the perforation is located in Schrapnell's membrane it is indicative of chronic suppurative otitis, and clinical experience teaches that a mastoid infection complicating a chronic suppurative inflammation of the middle ear pursues a more rapid course and is of graver prognostic import than if it be a complication of the acute disease. What has in my experience been the most reliable indication for surgery is sagging

of the posterior superior canal wall close to the drum membrane, and therefore corresponding to the floor of the antrum. I have never seen a case in which there was sagging of the canal wall in this location when I did not find pus in the mastoid when opened, and the time I did not find pus on opening the antrum this symptom was not present. The indications for surgery in this particular instance will be discussed later.

Tenderness on deep pressure over the mastoid is a symptom so generally recognized that I seldom have a case referred to me whose mastoid has not been thus tested. There are three significant points of tenderness, which in the order of their relative frequency and diagnostic value are: 1st, over the antrum, 2d, the mastoid tip, and, 3d, the point of emergence of the mastoid emissary vein. In getting antrum tenderness exert firm pressure a little behind the auditory meatus up and back at an angle of about forty-five degrees, and to eliminate furunculosis be sure the external auditory canal is not disturbed. Tip tenderness is best elicited by pressure upward from below. The mastoid tip is normally tender in some individuals, so to have this symptom of diagnostic value one must compare with the opposite side. It is not an uncommon experience in mastoid surgery to find much of the structure so free from infection that the surgeon may think he has been too hasty, but upon continuing his investigations to the tip find the large cells here located one mass of suppuration. It is in these cases that tip tenderness only is pronounced. Tenderness on pressure over the point where the mastoid emissary vein leaves the skull, although not so constant as the two preceding symptoms, is also of diagnostic and prognostic value. Unfortunately the location of this opening is variable, but is usually about half an inch above and half an inch behind the tip.



When firm pressure at this point produces severe pain in marked contrast to pressure on either side of it, one may expect to find extensive destruction of the mastoid cells with probably extension through the inner table of the skull and the formation of an epidural abscess. Unfortunately these pressure symptoms are only general, as there may be pus in the mastoid with conditions demanding immediate operation without pain on pressure.

Fluctuation over the mastoid is an exceedingly tardy aid in diagnosis, as it indicates rupture through the mastoid cortex with formation of a subperiosteal abscess. Had this pus ruptured through the inner table, as it would seem quite as natural that it should, there would be less opportunity for surgery, but probably another case added to the fatal terminations of brain fever.

It is almost impossible to get a pure specimen from the middle ear for bacteriologic examination, and for that and other reasons it is not of great prognostic value.

#### DIFFERENTIAL DIAGNOSIS

Early in my practice I once prepared for a mastoid operation, but fortunately made a second and more thorough examination with a diagnosis of deep-seated furuncle, which proved correct. And that you gentlemen may be saved the embarrassment of seeing a patient rapidly recover after the spontaneous rupture of a furuncle, when you had prepared her and her family for a major surgical procedure, or what is far more distressing, that you may be saved the mental anguish and deserved censure that comes to a man whose patient has been assured that she has a simple furuncle and dies from the intracranial rupture of a mastoid abscess, it is my purpose to discuss the differential diagnosis at the risk of wearying you with minute details.

True, a typical acute mastoiditis is no more to be confused with simple furun-

culosis than an acute appendicitis is with a simple enteritis, but they are not the typical cases that call for the exercise of diagnostic skill and do most to establish reputations.

The pain and temperature in the two conditions is of little diagnostic value and may be similar. The discharge, however, is quite different. In mastoiditis the discharge is usually present and does not relieve the inflammatory symptoms. There is a history of purulent discharge preceding the mastoid inflammation. In furunculosis, on the contrary, swelling and pain in the meatus and mastoid precedes the discharge and with the appearance of the latter all inflammatory symptoms subside.

Inspection early in mastoid inflammation reveals little. Swelling when present later in the disease is usually below and behind the ear. In furunculosis redness and swelling of the meatus and mastoid surface appears very early, is higher up on the mastoid, and involves the meatus more than in the former condition. In mastoiditis there is usually a discharge, the external two-thirds of the canal is not swollen, but there is sagging of the posterior superior segment. In furunculosis there is usually little or no discharge, the swelling may occur anywhere along the meatus and may occlude it entirely, thus obstructing any view of the tympanic membrane from which pus may usually be seen to issue in the former condition, but which is normal or only slightly reddened in furunculosis.

Of especial value in the differential diagnosis is palpation of the auricle and mastoid. In mastoiditis uncomplicated with subperiosteal abscess, all movements of and traction on the auricle are painless, whereas in furunculosis such manipulation is acutely painful. In mastoiditis deep pressure over the mastoid is painful, particularly over the antrum, tip, and

emissary vein, regardless of whether or not the auricle is moved. In furunculosis mastoid pressure is practically painless provided the auricle is not disturbed.

Unfortunately the proportion of cases which present the classical symptoms, both objective and subjective, do not represent the majority of those presented for treatment. In some the mastoid symptoms are pronounced from the first, but the fundus changes—discharge, sagging of the canal wall, and bulging—are at no time pronounced, or the fundus changes may be conspicuous with insignificant mastoid manifestations. Again, a patient after an attack of one of the exanthematous diseases may present symptoms of mastoiditis, hardly sufficient to justify surgery, but when the mastoid is opened the extent of the destruction wrought by the suppurative process is not only alarming, but suggestive of neglect.

While undue and injudicious haste is to be deprecated, given any case presenting the symptom complex above enumerated, the mastoid cortex should be opened, for if the careful perusal of otologic literature teaches anything, it teaches that in the past our sins of omission have in this particular been far greater than our sins of commission. In my own experience I have never opened but one mastoid where I did not find pus, and in that the operation was done for the distinct purpose of relieving an unbearable mastoid neuralgia, and did relieve it by draining the mastoid of an excessive serous exudate. With this exception I have been repeatedly alarmed at the extensive destruction of the mastoid structure, often involving the integrity of inner table of skull, and firmly believe that in doubtful cases the operation, while a major surgical procedure, is far less dangerous than the disease and should be resorted to more frequently than it is.

Given a case of mastoiditis, following

an acute suppurative otitis media, what should be the treatment—operate at once or try conservative measures? If the symptoms are alarming, operate. If not, be sure that the ear is draining freely, and if necessary do a free paracentesis of the drum membrane, carrying the incision out along the posterior superior canal wall, thereby doing an internal Wilde's incision. The mastoid ice-cap may be employed from twenty-four to forty-eight hours, and this with cleansing the ear in addition to elimination, etc., constitutes our non-surgical treatment. The ice-bag to be of value must be an ice-bag, not a bag full of more or less cold water, and must be applied constantly. It should not be used more than forty-eight hours, as it certainly relieves the pain, and if the subjective symptoms are thus held under control for too long a period great destruction may occur.

It is manifestly impossible to keep a subject of this kind within reasonable limits and give more than a most general description of the surgical technic.

After the patient has been prepared according to the rules of aseptic surgery, an incision is made over the mastoid region extending from the tip along the margin of the insertion of the auricle, leaving just enough room for the insertion of sutures, to a point almost corresponding to the upper margin of the external ear. This incision should not extend further upward than is necessary to retract the flap well, as the severing of unnecessary fibers of the temporal muscles may result in the ear sagging. It has been my custom of late to follow the teachings of Whiting and make a posterior flap extending directly backward from a point corresponding to the external meatus. In elevating the periosteum and retracting the flaps the utmost care should be exercised to preserve this nutrient membrane, and it is to emphasize

this point that the method of making the primary incision is fully discussed. The use of the self-retaining retractors will expose the mastoid region throughout its entire extent, so that the finger can be passed around the tip. The tissues must be so retracted that the bony meatus may be kept constantly in view, as it is an important landmark and guide.

Inspection of the field of operation will now give much valuable information. If you have a large broad flat mastoid with the angle formed by the mastoid cortex with the external auditory meatus an obtuse angle, the lateral sinus will probably be deep seated and situated so far back that with ordinary care there is little danger of wounding it; but if the process is round and narrow, be prepared for trouble, as the chances are that the sinus is superficially located and well forward. I have a case in the hospital whose lateral sinus was situated so far forward that it was impossible to get between it and the bony wall of the meatus with the narrowest chisel, without uncovering that great vessel. While these suggestions are general and in the majority of cases can be depended upon, it must ever be borne in mind that the location of the lateral sinus is as Knapp has aptly expressed it, "anywhere in the temporal bone."

There may be presented one or more fistulous openings through which the mastoid abscess has ruptured, and it is optional with the operator whether he enter the cavity along these openings that nature has provided or ignore them.

The suprameatal triangle should be mentally outlined, as a drill hole in this triangle will usually enter the antrum. The temporal ridge, that is, the posterior extension of the zygomatic arch, must be definitely located, as it is very little below the floor of the middle fossa, and you must

not go above it unless you wish to enter the cranial cavity.

After the surface has been carefully inspected and a general idea obtained as to the location of the sinus, etc., there are two methods of proceeding with the operation. European operators and many in this country believe in going directly to the antrum by chiseling parallel to the posterior superior margin of the bony meatus until the antrum is reached, and then remove all necrotic tissue. Another method, of which Whiting of New York is a prominent exponent, is to make a primary mastoid groove beginning at the temporal ridge immediately behind the bony meatus, and continue the groove to the tip of the mastoid. Then with curette and rongeur cautiously enlarge the opening and clean out all necrotic cells, letting the opening of the antrum be simply one step in the operation to be accomplished when most convenient. Personally I greatly prefer the latter method. Had I been chiseling in a small deep opening with the patient who had the anteriorly located sinus, the danger of injuring the vessel would have been much greater, and such an injury in the bottom of a small opening is much more difficult to care for than when one has sufficient room.

The further steps in the operation consist simply in the removal of *all* necrotic tissue, and in this respect the modern mastoid operation differs especially from the operation of Schwartze of forty years ago. While the earlier operators were content to drain the antrum, the modern otologic surgeon wishes to convert the antrum as nearly as possible into a shallow cup by virtue of most complete and thorough elimination of all mastoid cells, and to extend this cleansing process to the cells of the zygoma, the mastoid tip, and as far back as is indicated. Such thorough eradication of diseased tissue has resulted

in making the secondary operation almost unknown and shortened the healing process very materially indeed. It is not so very long ago that we were taught to remove only those cells which appeared diseased, but recent investigations have proven conclusively that macroscopic inspection can not distinguish the diseased from the healthy, and it is, therefore, much the better way to eradicate all. Thus the inner table of the skull becomes a smooth surface presenting an elevation over the lateral sinus, but with no cavities to harbor necrotic tissue which may subsequently cause trouble.

First among the accidents during this operation is injury to the lateral sinus. If its bony wall does not appear perfectly healthy, the diseased portion should by all means be purposely removed, and if under this is found a dura covered with granulations the sinus should be still further uncovered until a margin of healthy dura is presented. By so doing we know where the disease process ends and that there is no pus undrained. While it is not pleasant to uncover so important a vessel, it has been my fortune to meet with mastoid cases of such a type that the sinus has been exposed in more than one-half of my operations. Far different from simply uncovering the sinus is its injury, as this is a matter of extreme gravity both because of the danger of hemorrhage and of infection.

The functional result after the healing of the mastoid wound is usually very satisfactory. The time necessary for repair will depend very largely upon the thoroughness with which the operation is performed, and if all diseased bone is eradicated the patient should be able to leave the hospital in two or three weeks.

Just a word in regard to prophylaxis. After the infection has once extended to the mastoid, it is often impossible to avoid surgical treatment, so prevention of surgery depends upon the successful prevention of such extension. The paracentesis knife should be far more generally used by the general practitioner, and if his incisions are limited to the lower half of the tympanic membrane they are safe. An incised wound of the tympanic membrane will heal with much less scar than the tear of spontaneous rupture, and the prompt drainage thus obtained will lessen the destruction of intra-tympanic structures, as well as be a remarkable safeguard to the deeper tissue.

It is a pleasure to note that such incision under proper illumination, followed with antiseptic irrigation or dry treatment, as the case may indicate, is superseding sweet oil and Faith in the treatment of acute suppurative otitis media, and when this method of treatment is more generally adopted many an attack will be aborted which otherwise would develop a mastoiditis necessitating surgical interference.

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The next Annual Meeting of the Michigan State Medical Society will be held in Detroit September 27-28, 1911.

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Annual Meeting of the Upper Peninsula Medical Society  
at Escanaba July 27-28, 1911.



## IMMUNOLOGY OF ACUTE INFECTIONS\*

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Resistance against infection depends upon a number of means at the disposal of the organism. Which one plays the predominant part in a given case depends largely upon the predominant characteristic of the invader, and upon which one is operating also depends greatly, at the present time at least, the measure of our success in passively supplying biological aids to this defense. In the case of infections such as diphtheria and tetanus, where the damage is caused mainly by the absorption of diffusible toxins from a bacterial growth which is limited to a particular locality, we have been able to supply the patient with an amount of anti-toxin sufficient in most instances for his protection or cure.

In a large class of other infections, however, in which the symptoms are produced and the disease continues because of the growth and destruction in the blood system itself of the invading micro-organisms, and in which, because of this destruction in the blood stream and lymphatics, endotoxins are liberated with their deleterious effects, our efforts have been largely unsuccessful.

At present such serums as are employed depend mainly for their theoretical and practical effects upon their lytic powers, viz., their ability to cause lysis or solution of the bacteria against which they have been prepared. In other words, they are serums rich in immune substances, and particularly those immune substances responsible for bacteriolysis. These immune bodies are the product of repeated inocu-

lations of perfectly healthy animals with increasing doses of the specific organisms. As a result of these repeated doses, the serum of the inoculated animal gradually acquires a high degree of destructive power for the organisms which have constituted the inoculations. The measure of this destruction depends upon the freshness of the serum. Namely, when freshly drawn, it is high in lytic power. Upon keeping, due to the deterioration of certain labile substances, this power diminishes, but can be fully restored by the addition of small amounts of serum from any normal animal.

The employment of such serums, with the hope that benefit may be derived from them, demands the assumption of the presence of certain substances in the blood of the recipient which will render the dose fully potent, as well as a poverty in those immune bodies which are about to be injected. These assumptions are, to be more specific, that the injected antibodies will find in the blood of the patient a sufficient amount or concentration of those labile substances which were present in the immune serum when it was drawn from the animal but which have been lost by aging, and, secondly, that the stabile substances formed as a result of the infection are present in insufficient amount or concentration.

Therapeutic injections of bacterins require similar assumptions. For it is a well-established fact that bacterial inoculations give rise to the production of certain stabile antibodies, but influence very little,

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if at all, the content of labile substances.

If these assumptions are correct, we should, it seems to me, expect greater results from both lytic serums and bacterial injections in acute conditions. However, we are cognizant of the shortcomings of both of these forms of treatment in such processes. Further, through experiment we have long known that the production of immunity to a given micro-organism in a perfectly healthy animal is far easier than to produce cure of an infection once it has taken hold, and the protection of an animal against an inoculation of pathogenic organisms by the simultaneous injection of a dose of lytic serum is more frequently successful than the production of cure in an already infected animal by the injection or repeated injections of a lytic serum which would have protected him before the organisms had really got hold.

That this should be true has seemed enigmatical. In the hope of elucidating the matter somewhat, a number of experiments have been undertaken which I wish to present.

That we may get the matter in understandable form, therefore, it would seem to be advisable to review briefly but somewhat in detail certain fundamental facts. It will be recalled that bacteriolysis or solution of bacteria occurs in the serum of an animal which has been rendered immune to the particular micro-organisms both in vivo and in vitro. This action is rendered possible by the residence in the immune serum of two factors. (Pfeiffer, Metschnikoff, Bordet, etc.)

The first of these, the alexin or complement, is found in any fresh serum. It is destroyed gradually on standing and by the influence of heat and various chemicals. The second, the amboceptor of Ehrlich or substance sensibilisatrice of Bordet, while present to some extent in most serums, is

mainly the product of inoculation or immunization and is relatively stable. When bacteria encounter in a serum their specific amboceptors, complement or alexin of course being present, a combination occurs between the bacteria, the amboceptors, and the complement. This results in a solution of the micro-organisms, which is quite as complete as and is comparable to the solution of grains of sugar in water.

That a reaction of the above character may occur in vitro, however, requires the presence of certain favorable thermic conditions. Amboceptor can combine with the bacteria or antigen at any temperature; alexin is most active at the temperature of the body.

Not only are these facts regarding solution true in the case of bacteria, but it has been found that a similar result is obtained when an animal is rendered immune to the blood cells of an animal of another species. This latter phenomenon is called hemolysis.

Moreover, certain quantitative relationships have been learned about hemolysis and bacteriolysis. (Neisser, etc.) Namely, it has been found that within certain limits this relationship is such that the employment of a large amount of one factor, say complement, permits the use of a less amount of the other factor, namely the amboceptor. With less than one unit of amboceptor, even though there be more than one unit of complement, hemolysis, of course, cannot be complete. Neither can it be complete in the presence of one unit of amboceptor and less than one unit of complement. When more than one unit of amboceptor and less than one unit of complement are used, however, hemolysis may or may not be complete, according to the relative amounts of each factor used. An amount of complement too small to produce hemolysis when used with one amboceptor unit may produce complete hemolysis with several amboceptor units.

Hence it can be seen that with such a relationship existing, where any attempts at measurements in vitro are to be made, the employment of definite quantities of each factor is necessary in order to obtain any accurate knowledge of the relative amounts of either factor present in a given serum.

The Wasserman test for syphilis is a manipulation of the various principles entering into the phenomena of bacteriolysis and hemolysis as above stated, whereby a suspected serum is tested for the presence of specific immune bodies.

Because the value of this reaction is now so well established, and because of the often inconclusive findings with the Widal test in typhoid fever, the suggestion lent itself to me that perhaps a test for bacteriolytic antibodies might yield an earlier and larger percentage of positive results than the test for agglutinins.

A series of experiments were therefore undertaken with the object of learning whether bacteriolytic immune bodies are present during the course of typhoid fever.

Fifty-one cases in all have now been examined, with the result that it can be definitely stated that bacteriolytic antibodies are present throughout the course of the disease and are present in no small amounts.

In the first twenty-seven cases examined, the report of which has appeared in a previous communication,\* I was quite unaware of the quantitative relationships I have mentioned above, and my conclusions drawn at that time are open to criticism because of this fact. Lately, however, in a series of twenty-four cases, I have been able to arrive at the same conclusions while taking cognizance of these relationships.

The determination of the fact that typholytic amboceptors are present during

the course of the disease, as with the Wasserman test, is accomplished by a manipulation of the various factors entering into hemolysis and bacteriolysis. The preparation of the various components used is as follows:

#### SERUM

The serum to be tested is obtained thus: Into a sterile simplex syringe, i. e., that variety used by dispensers of biological products as containers for antitoxin, etc., are drawn two or three cubic centimeters of a sterilized anticoagulating fluid. The fluid I have used has been a 1% sodium citrate in .85% sodium chloride solution. The reason for the employment of a fluid which prevents the blood from coagulating, in this instance, is that I have found it a somewhat more convenient way of obtaining serum in sufficient quantities than obtaining it after clotting, and also because of the fact that where it is desired to measure the complement content, we can be sure that this has not been raised by the expression of alexin from the leucocytes during the clotting. The area over the median basilic or cephalic vein of either elbow of the patient is rendered aseptic after the usual methods, the vein entered with the needle of the syringe, and an amount of blood equal to the volume of anticoagulant withdrawn by slowly drawing on the piston. The mixture is shaken and stood away to settle. After from six to twelve hours the corpuscles are found to have settled upon the piston head, while above them is a supernatant clear straw-colored fluid which is approximately one-half full strength serum.

#### HEMOLYTIC SERUM

A hemolytic serum is obtained by inoculating a guinea pig or rabbit subcutaneously at about four or five day intervals with two or three cubic centimeters of washed human blood corpuscles in normal

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saline solution. Each successive dose is increased by one or two cubic centimeters. Four or five injections usually produce an effective serum. Ten days after the last injection, the blood is obtained from the animal by puncturing the heart with a needle attached to a simplex syringe containing anti-coagulant. The supernatant fluid remaining after the corpuscles have settled is carefully decanted and the complement contained in it destroyed by heating at 56° C. for one half hour. Before being ready for use, the amboceptor content must now be standardized as follows:

Into a series of test tubes is placed a definite and equal amount of 5% corpuscle suspension (1 C. C.) and then there is added to each tube an amount (.2 C. C.) also definite and equal, of a normal serum which has been found incapable in itself of causing hemolysis. There is next added, in series, decreasing graduated amounts of the inactivated hemolytic serum, and finally to each tube normal saline solution is added to a constant volume. The titre is expressed as the smallest amount of the serum which produces complete hemolysis in the presence of the excessive amount (.2 C. C.) of the given complement.

#### BACTERIA

Twenty-four hour agar slant cultures of typhoid bacilli are washed off with physiological salt solution and standardized, so that each cubic centimeter contains 500,000,000 bacilli.

#### BLOOD CELLS

Red corpuscles from a normal human being are secured in a manner similar to that described for obtaining the serum from a typhoid patient. After settling, the supernatant fluid is forced out of the syringe by pushing the piston and more anti-coagulant drawn in to replace it. The corpuscles are thus washed at least three

times, and after dilution to make a 5% suspension are ready for use.

#### THE TEST

In applying the test, .2 C. C. of serum from the patient with suspected typhoid is placed in a small test tube and to it is added 1 C. C. of the bacterial suspension. The tube is kept at body temperature for one hour. If the patient has typhoid fever and typhoid amboceptors are present, the following combination should occur:

Complement      amboceptor + bacteria  
= solution.

After keeping the tube at 37 degrees centigrade for one hour to allow the above combination to occur, if possible, two amboceptor units (in the case of the present series .2 C. C.) of the inactive hemolytic serum and 1 C. C. of the 5% suspension of blood cells are added. The tube is again placed in the incubator, this time for two hours. Upon removal from the incubator it is allowed to stand on the ice for twenty-four hours longer. If the patient from whom the serum was taken has typhoid fever and amboceptors are present, the combination of complement, amboceptors and bacteria will occur. This causes the using up of all the complement of the serum. After the addition of the inactivated hemolytic serum and the blood corpuscles, there being no complement left to enter into the combination, hemolysis cannot occur and the blood cells remain undissolved.

If, on the other hand, the patient does not have typhoid fever, the complement will still remain, there being no amboceptors to enter into combination with it and the bacteria. It will hence be free to act when the inactive hemolytic serum and blood corpuscles are added, and the following reaction will occur:

Complement + hemolytic amboceptors  
+ blood cells = hemolysis. This is in-



licated by the presence in the tube of a wine red transparent fluid.

In the tests as set up, .2 C. C. of the serum anticoagulant solution are employed in each case, .2 C. C. of the diluted serum being considered equivalent to .1 C. C. undiluted serum such as is obtained from clotting of blood, and in the case of normal pooled serum this amount almost invariably contains enough complement to hemolyse 1 C. C. of a 5% suspension of corpuscles in the presence of 2 amboceptor units.

As previously stated, this test has been applied to serum from fifty-one patients, all of them either frank or suspected cases of typhoid fever. In thirty-seven of these, presenting throughout the typhoid syndrome, typholysins were found to be present. In one case the patient had not been longer than three days sick. In another case, although clinically typhoid, neither the Widal nor lysin test could be obtained, and we were forced to designate it paratyphoid. In the thirteen remaining cases, with typholysins absent, the subsequent history showed them to be illnesses of another character.

We may conclude, therefore, that lytic antibodies are early demonstrable in typhoid fever.

These findings suggest an interesting line of thoughts. Lytic anti-bodies are present during the height of infection, and are hence not used up as fast as formed, as would almost be expected. Why? Complement is of course present. But the infection still continues. With amboceptors in the blood, why does not lysis of the germs occur and the disease cease? For it has been shown by Coleman and Buxton that the blood is responsible for the destruction of the organisms with the liberation of their endotoxins, which action is responsible for the symptoms of the disease. Complement + amboceptor + bacteria

should produce solution of the organisms, and following this we should soon expect a cessation of the symptoms. Can it be that complement is deficient, and, if deficient, that this has some bearing upon the course of the disease?

In order to elucidate this point it is necessary to determine what the average complement content of serum from normal individuals is, and see how that complement content compares with that of the serum of typhoid patients. Several ways of determining this relationship are possible, and I have employed at various times different methods. In my earliest work, before I realized the existence of the quantitative relationships previously mentioned, I employed a manipulation in which the following constituents were used:

1. Serum from three or four normal individuals pooled.
2. Serum from patients in various stages of typhoid fever.
3. Five per cent. suspension of washed human erythrocytes.
4. Serum of a guinea pig which had been immunized to human blood cells, and in which the complement had been rendered inactive by heating at 56 % C. for one-half hour.
5. Serum from patients just recovered from typhoid.

The typhoid, normal or post-typhoid serum supplied the complement; the hemolytic serum furnished the hemolytic amboceptors. Complement + blood cells + hemolytic amboceptors should give solution of the blood cells.

In the tests as set up in this series, the activity of the complement contained in the serum being tested was gauged by the volume of blood corpuscles a definite and fixed amount could take when in the presence of an amount, also definite and fixed, of hemolytic amboceptors, the further condition being that the tubes remained in the incubator two hours and then re-

mained at room temperature for twenty-four hours.

Gauging the amount of bacteriolytic complement present by the amount of hemolytic complement is legitimate if the observations of Gay and Ayer are true concerning this point.

By actual experiment they were able to prove to their satisfaction the truth of the opinion long held by Bordet and his school, that hemolytic and bacteriolytic complement may be used interchangeably.

The following chart represents an average finding by this method:

(1) .2 C. C. normal serum + 1 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(2) .2 C. C. normal serum + 1.5 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(3) .2 C. C. normal serum + 1.75 C. C. erythrocytes + .2 C. C. hemolytic serum = partial solution.

(4) .2 C. C. normal serum + 2 C. C. erythrocytes + .2 C. C. hemolytic serum = very little change.

(5) .2 C. C. typhoid serum + .7 C. C. erythrocytes + .2 C. C. hemolytic serum = very little change.

(6) .2 C. C. typhoid serum + .5 C. C. erythrocytes + .2 C. C. hemolytic serum = partial solution.

(7) .2 C. C. typhoid serum + .25 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(8) .2 C. C. post-typhoid serum + .25 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(9) .2 C. C. post-typhoid serum + .5 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(10) .2 C. C. post-typhoid serum + .7 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(11) .2 C. C. post-typhoid serum + 1 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(12) .2 C. C. post-typhoid serum + 1.5 C. C. erythrocytes + .2 C. C. hemolytic serum = complete solution.

(13) .2 C. C. post-typhoid serum + 1.75 C. C. erythrocytes + .2 C. C. hemolytic serum = partial solution.

(14) .2 C. C. post-typhoid serum + 2 C. C. erythrocytes + .2 C. C. hemolytic serum = very little change.

The following conclusions therefore seem justified:

1. In a given volume of normal serum there are several times as much complement present as is present in a given volume of serum from a typhoid fever patient.

2. In the serum of a patient recovered from typhoid the amount of complete approximates or equals the amount in normal serum.

About this time I encountered an article which Thompson had published in 1903 concerning the results of a comparative measurement of the complement content of a series of variola, varioloid and normal serums, gauged by the bactericidal powers of a measured quantity on typhoid and B. Coli organisms. The method consisted in adding a definite quantity (1-20th C. C.) of the serum to be tested to 1 C. C. of inactivated serum, either rabbit or human, in contact with a definite volume of a definitely dense suspension of the organisms for from six to twenty-four hours, transferring two loopfuls to a tube of liquefied agar which was then plated and the colonies which developed counted. He found that under such circumstances this amount of normal serum in contact with the given volume of typhoid suspension was sufficient to ensure perfectly sterile plates, while in the case of serum from individuals sick with variola and varioloid, from six to fourteen thousand colonies usually developed.

Employing his technique in regard to typhoid serums in a series of ten cases, the results were as follows:

Case	Colonies at end of 24 hours	Case	Colonies at end of 24 hours
1	12400	6	20800
2	14650	7	21900
3	19400	8	13600
4	18400	9	12800
5	8040	10	11000

Although entirely different in the method of procedure, the results of these experiments warrant the conclusion that the bactericidal power of serum from typhoid patients against the typhoid bacillus is less than that of serum from normal individuals. And inasmuch as it is generally held (and easily verified) that the bactericidal power of serum depends upon its complement content, the above statement is equivalent to saying that the complement content of typhoid serum is considerably lower than that of normal serum.

In endeavoring further to assure myself that there is really a lowered complement content during the course of typhoid fever, a final series of tests along this line were conducted, in which the constituents were practically the same as those employed in my first series of tests, but in which there was employed in each instance a definite volume (1 C. C.) of a 1% suspension of corpuscles and two hemolytic amboceptor units, it being considered conducive to greater accuracy to use an excess of amboceptors, with graduated amounts of the serum to be tested and the whole brought to a constant volume by the addition of salt solution, the titre of the complement content being the smallest amount of serum which was found to be necessary for the complete dissolution of all the corpuscles.

Establishing my normal standard by this method, I found that .03 C. C. of my citrate-normal serum combination sufficed to surely cause hemolysis of 1 C. C. of 1% corpuscle suspension in the presence of two hemolytic amboceptor units, the conditions being that the amboceptors

and corpuscles should be incubated for one hour, the complement then added, and the reaction read at the end of ten minutes.

Gay, using 1 C. C. of 5% corpuscles saturated with hemolytic amboceptors as a standard, has found that an average of 1-40th C. C. of normal serum is required to furnish enough complement to lake all the corpuscles. When we consider that the alexic activity of serum is augmented during the process of clotting owing to the fact that alexin is expressed from the leucocytes, and the fact that by using citrate solution in which to receive the blood that clotting is prevented together with this indefinite increase in alexin, and also the fact that the serum used in my tests is diluted with an equal amount of citrate solution, our standards, at first consideration seemingly so different, are probably nearly equivalent. Chart Number 2 demonstrates the manner of procedure:

CHART No. 2

- (1) 1 C. C. of 1% corpuscles + 2 amboceptor units + .01 C. C. citrate normal serum + citrate to constant volume.
- (2) 1 C. C. of 1% corpuscles + 2 amboceptor units + .02 C. C. citrate normal serum + citrate to constant volume.
- (3) 1 C. C. of 1% corpuscles + amboceptor units + .03 C. C. citrate normal serum + citrate to constant volume.
- (4) 1 C. C. of 1% corpuscles + 2 amboceptor units + .04 C. C. citrate normal serum + citrate to constant volume.
- (5) 1 C. C. of 1% corpuscles + 2 amboceptor units + .05 C. C. citrate normal serum + citrate to constant volume.
- (6) 1 C. C. of 1% corpuscles + 2 amboceptor units + .1 C. C. citrate normal serum + citrate to constant volume.
- (7) 1 C. C. of 1% corpuscles + 2 amboceptor units + .15 C. C. citrate normal serum + citrate to constant volume.
- (8) 1 C. C. of 1% corpuscles + 2 amboceptor units + .01 C. C. citrate typhoid serum + citrate to constant volume.
- (9) 1 C. C. of 1% corpuscles + 2 amboceptor units + .02 C. C. citrate typhoid serum + citrate to constant volume.

(10) 1 C. C. of 1% corpuscles + 2 amboceptor units + .03 C. C. citrate typhoid serum + citrate to constant volume.

(11) 1 C. C. of 1% corpuscles + 2 amboceptor units + .04 C. C. citrate typhoid serum + citrate to constant volume.

(12) 1 C. C. of 1% corpuscles + 2 amboceptor units + .05 C. C. typhoid citrate + citrate to constant volume.

(13) 1 C. C. of 1% corpuscles + 2 amboceptor units + .1 C. C. typhoid citrate + citrate to constant volume.

(14) 1 C. C. of 1% corpuscles + 2 amboceptor units + .15 C. C. typhoid citrate + citrate to constant volume.

(15) 1 C. C. of 1% corpuscles + 2 amboceptor units + .2 C. C. typhoid citrate + citrate to constant volume.

(16) 1 C. C. of 1% corpuscles + 2 amboceptor units + .25 C. C. typhoid citrate + citrate to constant volume.

(17) 1 C. C. of 1% corpuscles + 2 amboceptor units + .3 C. C. typhoid citrate + citrate to constant volume.

(18) 1 C. C. of 1% corpuscles + 2 amboceptor units + .4 C. C. typhoid citrate + citrate to constant volume.

(19) 1 C. C. of 1% corpuscles + 2 amboceptor units + .01 C. C. post-typhoid citrate + citrate to constant volume.

(20) 1 C. C. of 1% corpuscles + 2 amboceptor units + .02 C. C. post-typhoid citrate + citrate to constant volume.

(21) 1 C. C. of 1% corpuscles + 2 amboceptor units + .03 C. C. post-typhoid citrate + citrate to constant volume.

(22) 1 C. C. of 1% corpuscles + 2 amboceptor units + .04 C. C. post-typhoid citrate + citrate to constant volume.

(23) 1 C. C. of 1% corpuscles + 2 amboceptor units + .05 C. C. post-typhoid citrate + citrate to constant volume.

(24) 1 C. C. of 1% corpuscles + 2 amboceptor units + .1 C. C. post-typhoid citrate + citrate to constant volume.

In the manner illustrated in this chart a comparison has been made between the complement content of thirty normal serums, forty typhoid serums, and eleven serums of patients recently recovered from the disease.

The tabulation of the complement-content of the normal cases in terms of the

amount of citrate serum required to cause complete laking is as follows:

Case	Required	Case	Required
1	.02 C. C.	16	.01 C. C.
2	.03 "	17	.03 "
3	.01 "	18	.02 "
4	.01 "	19	.02 "
5	.03 "	20	.02 "
6	.01 "	21	.03 "
7	.02 "	22	.01 "
8	.01 "	23	.02 "
9	.02 "	24	.05 "
10	.01 "	25	.02 "
11	.01 "	26	.02 "
12	.03 "	27	.05 "
13	.02 "	28	.1 "
14	.01 "	29	.02 "
15	.01 "	30	.03 "

On an average .023 C. C. of citrate-normal-serum was required for a complete reaction, and this may be taken as the average of the complement content of this series of normal serums.

In the case of the typhoid serums examined, the tabulation is as follows:

Case	Required	Case	Required
1	.04 C. C.	21	.07 C. C.
2	.05 "	22	.14 "
3	.1 "	23	.07 "
4	.15 "	24	.04 "
5	.08 "	25	.04 "
6	.05 "	26	.07 "
7	.07 "	27	.1 "
8	.07 "	28	.05 "
9	.1 "	29	.04 "
10	.08 "	30	.05 "
11	.04 "	31	.07 "
12	.05 "	32	.05 "
13	.17 "	33	.08 "
14	.07 "	34	.04 "
15	.05 "	35	.13 "
16	.04 "	36	.05 "
17	.05 "	37	.07 "
18	.1 "	38	.03 "
19	.04 "	39	.05 "
20	.04 "	40	.05 "

The average amount of typhoid serum required to furnish enough complement to react completely is seen to be about .068 C. C., an amount greatly in excess of the amount of normal serum required to



produce the same effect. Hence, it is evident that during the course of typhoid fever, complement is greatly diminished. Further, it was noted by reference to the chart of the patient that the nearer to convalescence we were, the higher the titre of the serum.

The tabulation of the results obtained in testing the post-typhoid serum is as follows:

Case	Required	Case	Required
1	.01 C.C.	7	.01 C.C.
2	.02 "	8	.04 "
3	.01 "	9	.02 "
4	.02 "	10	.02 "
5	.05 "	11	.03 "
6	.03 "		

Attention to these results shows that in post-typhoid serum, the complement content again coincides fairly accurately with that of a normal serum.

Up to this point, then, we have learned that lytic amboceptors or immune bodies are present during the course of typhoid and that this presence of immune bodies is accompanied by a low complement content. We know that in an immune serum we have a normal complement content associated with a great excess of amboceptor. Can it be that during the course of an infective fever, i. e., during the stage of acquiring immunity, that associated with the low complement content there may be a relatively high amboceptor content? To determine whether such a relationship as we have surmised really does exist or not, another rather complicated series of tests are required.

Definite and equal quantities of serum from the infected individual and organisms of the kind the person from whom the serum is taken is infected with are mixed in a series of test tubes, in such amounts that when in contact with the specific amboceptors there are sufficient bacteria to fix all the complement in the volume of serum used. To the series of test tubes

containing the above combination, are added graduated amounts of normal serum. The amount of normal serum which needs to be added to such a combination in order to produce fixation of all the specific immune amboceptors and leave enough complement free to produce complete hemolysis of a fixed volume of corpuscles will give an approximate idea of the excess of bacteriolytic amboceptors over complement. Thus:

(1) .2 C. C. typhoid serum + 1 C. C. typhoid bacilli (500,000,000 per C. C.) + incubation one-half hour + .25 C.C. 5% erythrocytes (an amount which would be completely hemolysed by .2 C. C. typhoid + 2 hemolytic units) + 2 hemolytic units.

(2) .2 C.C. typhoid + 1 C.C. bacteria + .5 C. C. normal + incubation + .25 C. C. erythrocytes + 2 units hemolytic.

(3) .2 C. C. typhoid + 1 C.C. bacteria + 1 C. C. normal + incubation + .25 C. C. blood + 2 units hemolytic.

(4) .2 C. C. typhoid + 1 C. C. bacteria + 1.5 C. C. normal + incubation + .25 C. C. blood + 2 units hemolytic.

(5) .2 C. C. typhoid + 1 C. C. bacteria + 2 C. C. normal + incubation + .25 C. C. blood + 2 units hemolytic.

(To all of these citrate was added to make a total quantity 4.25 C. C.)

(In these tests when done with a specimen from one typhoid patient, in Number 2 hemolysis was complete, thus showing that while an excess of amboceptors over complement was present, nevertheless the excess was not very great.)

It was found in the main that when .2 C. C. typhoid serum is incubated for one hour in the presence of 500,000,000 typhoid bacilli and an excess of normal serum, to permit the combination of complement, bacteria and typhoid amboceptors, and then adding to the mixture .25 C. C. erythrocytes and two units of hemolytic serum, that in the combination of .2 C. C. typhoid serum plus 1 C. C. normal serum there is still insufficient complement to

saturate all of the typhoid amboceptors and leave sufficient complement free to combine with the hemolytic amboceptors and accomplish hemolysis.

This whole test, therefore, demonstrates that during the course of typhoid fever an excess of typhoid amboceptors is present, and that the amount of complement which is present is not at all proportionate. Repetition of tests, using specimens taken from the same patient at different times and from other patients, discloses the fact that what complement is present varies from time to time in the same patient and varies in different patients, but is always far less than the amount of amboceptor, and, further, it is always less than in normal serum, at least until convalescence begins. And immediately after convalescence begins, the complement content returns to the point it was before the infection began, the amboceptor content still remaining high. Thus is attained the relationship we know to be present in an immune serum, viz., a high amboceptor content associated with a normal amount of complement.

Another rather easy way of gaining some idea of the deficiency of complement and its association with a high amboceptor content, though incapable of anything like accurate measurement, is as follows:

To a definite volume of serum from a normal individual is added two loopfuls of a broth culture of the organism against which it is to be tested and the mixture incubated for twelve hours. This gives an opportunity for the full bactericidal action of the serum to assert itself. Two loopfuls of this mixture are now transferred to a tube of liquefied agar, plated, and the plate placed in the incubator for twenty-four hours. At the end of this time it is examined and it is noted that quite a fair growth has developed.

The same procedure is gone through

with in the preparation of a second plate, except that serum from the individual with the infection is employed instead of that from a normal person. At the end of the second incubation it is found that in this instance the plate is simply overgrown.

In preparing a third plate an amount of inactivated serum from the infected individual equal to the amount of active serum originally employed is combined with the bacteria and incubated. An equal amount of active normal serum is now added and the mixture again incubated. After this incubation a plate is prepared. The colonies which develop in this instance are found to be very few, fewer far than the number developing in either of the preceding instances. This of course demonstrates, although somewhat crudely, that serum from an infected individual is far less germicidal for the organisms producing the infection than is an equal volume of serum from a normal person, and, further, that the amboceptor content of such a serum when added to the complement and amboceptor contained in an equal volume of normal serum enhances the germicidal power to such an extent that it can only be attributed to the richness of the immune serum in anti-bodies.

Do not these facts, then, necessitate somewhat of a rearrangement of the preceding assumptions regarding passive immunity production in infected individuals, and possibly explain to some extent, at least, some of our shortcomings in serological treatment?

For example, let us consider for a moment the employment of vaccines, other than early, in acute generalized infections or in acute infections in which there is abundant opportunity for the free admittance of auto-inoculations from the infected area. It seems to me that in the light of the preceding facts their use in

such instances, besides having proven clinically unsatisfactory in the hands of most observers, is theoretically illogical. For, a priori, such practice, in order to be logical requires the assumption that the infected organism is responding imperfectly to its auto-immunizing process by the production of insufficient amboceptors to meet the emergency. It requires, further, that the other substance necessary to harmonious interaction, viz., the complement, is present in sufficient concentration.

By the experiments above adduced, however, it is readily seen that neither assumption is true.

Vaccines, on the other hand, when employed early in the course of acute generalized infections, would seem to have a more reasonable basis. Clinically, at least, the employment of inoculations under such circumstances has seemed to be more generally productive of favorable results.

That this should be the case might be expected from laboratory findings. For in just such cases a determination of the complement and amboceptor indices supplies the key to the situation.

The complement index of a serum may be determined by finding the smallest amount which will supply sufficient complement to cause complete hemolysis of a fixed volume of corpuscles in the presence of two hemolytic amboceptor units in a given time as compared with the amount of normal pool serum required to produce the same result. The amount of normal serum which is required under such circumstances divided by the amount of the serum under investigation required may be called its complement index. Thus:

#### COMPLEMENT INDEX

- (1) . 01 C. C. normal pool serum + 1 C. C. of 1% erythrocytes + 2 amboceptor units =
- (2) . 02 C. C. normal pool serum + 1 C. C. of 1% erythrocytes + 2 amboceptor units =

(3) . 03 C. C. normal pool serum + 1 C. C. corpuscles + 2 hemolytic units =

(4) . 04 C. C. normal pool serum + 1 C. C. corpuscles + 2 amboceptor units =

(5) . 05 C. C. normal pool serum + 1 C. C. corpuscles + 2 amboceptor units =

(6) . 01 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(7) . 02 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(8) . 03 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(9) . 04 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(10) . 05 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(11) . 08 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(12) . 1 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(13) . 15 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(14) . 2 C. C. serum to be tested + 1 C. C. corpuscles + 2 amboceptor units =

(The erythrocytes and amboceptor are incubated one hour, the complement added and the results read after ten minutes.)

The former divided by the latter equals complement index.

The method of determining the amboceptor index is an indirect one, and one into which two standards enter for consideration. These are in the first place the amount of amboceptors present in the serum of an average normal person in which there is a normal complement content associated with an amount of amboceptors sufficient to protect the individual against a certain limited amount of contagium, and, secondly, the serum of an immune person in which the amboceptor content is high by virtue of recovery from an attack of the disease.

The first of these standards is relatively unimportant, since the resistance of such serums may be readily determined by the complement titre, there being almost always sufficient amboceptors to balance this.

The second standard is the important

one, since it is only when a serum contains an amount of amboceptor which approximates the content of an immune serum that it can be fully relied upon to successfully combat large and repeated doses of contagium.

The amboceptor index of a serum, then, is the measure of the amboceptor content as compared with that of pool serum of individuals recovered from the infection in question. The only method we have been able to devise, however, as we have said, is an indirect one. In it the amount of amboceptor present is gauged by the amount of complement it will fix.

It is determined as follows:

#### AMBOCEPTOR INDEX

Ascertain how much complement is necessary to be added to a definite amount of inactive infective serum plus an excessive volume of a suspension of organisms, so that after the mixture has been incubated for one hour all the amboceptors shall be fixed and yet leave sufficient complement free to combine with the hemolytic system.

Also ascertain how much inactive serum from an individual immune to the given infection by virtue of recent recovery from the disease must be added to a similar combination in order to produce a like effect.

The latter divided by the former gives a figure which may be considered as the denominator of a fraction whose numerator is 1, the fraction thus obtained representing the measure of the amboceptor relationship of the compared sera. Thus:

(1) . 03 C. C. inactive infective serum + . 2 C. C. normal pool serum + 500,000,000 organisms + incubation for one hour + 1 C. C. of 1% corpuscles + 2 amboceptor units + incubation for one hour =

(2) . 03 C. C. inactive infective serum + . 3 C. C. normal pool serum + 500,000,000 organisms + incubation for one hour + 1 C. C. of 1% corpuscles + 2 amboceptor units + plus incubation for one hour =

(3) . 03 C. C. inactive infective serum + . 5 C. C. normal pool serum + 500,000,000 organisms + incubation for one hour + 1 C. C. of 1% corpuscles + 2 amboceptor units + incubation for one hour =

(4) . 03 C. C. inactive infective serum + . 7 C. C. normal pool serum + 500,000,000 organisms + incubation for one hour + 1 C. C. of 1% corpuscles + 2 amboceptor units + incubation for one hour =

(5) . 03 C. C. inactive infective serum + 1 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

(6) . 03 C. C. inactive infective serum + 1 . 5 C. C. normal serum + organisms + corpuscles + 2 amboceptor units + incubation =

(7) . 03 C. C. inactive infective serum + 2 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

(8) . 03 C. C. inactive post-infective serum + . 2 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

(9) . 03 C. C. inactive post-infective serum + . 3 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

(10) . 03 C. C. inactive post-infective serum + . 7 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

(11) . 03 C. C. inactive post-infective serum + 1 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

(12) . 03 C. C. inactive post-infective serum + 1 . 5 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

(13) . 03 C. C. inactive post-infective serum + 2 C. C. normal serum + organisms + incubation + corpuscles + 2 amboceptor units + incubation =

Measurements of complement taken in the above manner disclose the fact that early in the course of a bacterial infection the complement index is low, while the amboceptor content may be more or less than that of normal serum but is always less than that of an immune serum. This is not true later in the course of the disease, since at this time it is found that



although the complement index may still be low, the amboceptor content approximates the immune standard. Bacterial inoculations, we know, increase the content of amboceptor, and it is a recognized fact that a small amount of complement in the presence of a very large amount of amboceptor may accomplish the same results as a very much larger amount of complement associated with a smaller amount of amboceptor. It may be due to this fact or to the fact that the injection produces a sufficient increase of amboceptor to tide the individual over until his complement producing mechanism has risen to the occasion that results are obtained from bacterial injections in this class of cases.

Longscope, in an investigation of the complement-content of the infectious diseases in general, has found that the complement is consistently low and is diminished still more when septic complications intervene.

Perkins, Gay, and Thompson found a diminished bacteriolytic complement content in variola.

Loewenstein notes a decrease in human diabetes, induced diabetes in animals and in infections; Sweet in experimental diabetes.

Szekely and Szana noted diminished complement in the course of anthrax of man and animals.

Further, a lowered complement content is demonstrable in conditions we all recognize under the caption of "lowered vitality."

Longscope and Wright noted a lessened content in individuals suffering from anxiety or fatigue.

In an examination of the complement content of persons suffering from simple constipation unattended by symptoms such as might be termed clinically as severe autointoxication and interpreted from the laboratory standpoint as infections with the colon bacillus, I have found almost

uniformly a lowered complement index.

Likewise in three out of ten pregnant women, apparently healthy, the complement content was far lower than could be reasonably attributed to the normal variation, and one of these patients presenting a lowered complement index developed an attack of facial erysipelas while under observation.

In a similar manner I have demonstrated a low complement content in lobar and broncho-pneumonia, in tonsillitis, in septic conditions of various kinds, in alcoholism and in gonorrheal arthritis.

Since these relationships exist, it would seem that a great many clinical facts long recognized may possibly be explained along these lines. It is common knowledge, for example, that individuals enervated by fatigue, nervous strain, or dissipation are prone to the development of infections. That this should be the case might rather be expected from the lowered complement content of their serum.

Then, too, it is generally recognized that pregnant and puerperal women are more susceptible to infection than when not enceinte. The complement index of some pregnant women, at least, is abnormally low, and the fact that one of the women whose index was taken and found to be low developed an infection within a few days of this time, as well as the fact that others have noted a lowered complement content to be followed by an infective process, would seem to add importance to the supposition that a lowered complement index is causally related to the development of infections.

Therapeutically, too, it is not improbable that a recognition of the serum's poverty in complement under some circumstances may indicate other measures of treatment than those already at our disposal.

Personally, I cannot but be impressed with the importance of the complement

index and its relationship to the amount of amboceptor present, and I believe that whereas in the past most of our attention has been directed to measures designed to raise the content of amboceptors, in the future due consideration will be given to those means which may be expected to increase the amount of complement present, or, at least, to enhance the value of what complement is present.

J. C. Torrey, as the result of research concerning bacteriolysis of the gonococcus and the meningococcus with normal and specific immune sera, concludes that the low bactericidal action of certain immune serums is due to fluctuations in the complement content and not to a poverty in immune bodies.

F. P. Gay and J. B. Ayer, after measuring the alexic activity of normal human serum, venture the statement that "the consensus of opinion attributes the variation of resistance in normal and diseased individuals, at least so far as such resistance is evidenced in the blood serum, to fluctuations in that factor which is the essential destructive agent for invading micro-organisms, viz., the alexin." Incidentally they noted that in the presence of an attack of influenza the complement content was low, and that another individual whose complement they found low while under observation developed a series of boils. The conclusion they draw, however, is that the infection produces the low complement content.

In view of the observations above mentioned, however, is it presumptuous to reverse the order and suppose that the complement content permits the infection to occur rather than that it is the result of the infection? From laboratory experimentation to clinical demonstration should, if our observations are true, not be a long step. It has seemed to me

that with the above relationships existing there must be some influence attributable to the amount of complement available. In an effort, therefore, to determine from both clinical and laboratory standpoints what the results of attempts to passively raise the complement content in acute infections would be a few cases have already received injections of fresh serum of high complement content in repeated doses of considerable size, and a large amount of further experimentation along this line is contemplated.

As yet, too small a number of cases have been treated to merit reporting. It may be said at this juncture, however, that the results thus far obtained have seemed to corroborate the truth of our hypotheses, and we hope to be able to make a further report in a future communication.

Hiss and Zinsser, recognizing the importance of cellular exudation in infective processes, and believing that in the disintegration of the leucocytes some substance or substances were liberated which produced a favorable influence on the infection, have tried the therapeutic injections of leucocytic extracts with favorable curative results. In explanation of the *modus operandi* they suggest the possible influence of the complement contained in the extract.

It may be that a greater measure of success in treating acute infections will be possible when means have been adduced whereby the proper quantitative relationship of complement to amboceptor may be produced.

In conclusion, I desire to thank the members of the resident and visiting staffs of St. Mary's Hospital for their many kindnesses in providing me with material to carry on these investigations, and also the Research Department of Parke, Davis & Company for the use of their library.

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## GOLDEN RULES OF PEDIATRICS

## ZAHORSKY

Examine the throat in every case of an acute fever. Never forget this golden rule.

It is a golden rule, it should be remembered, to give as high a percentage of protein as is possible. Do not keep the baby on a milk mixture which contains a very low percentage of protein for too long a time. Remember that infants who can digest pure undiluted cow's milk really grow most rapidly.

Do not forget that an acute fever may be caused by acute adenoiditis following follicular tonsillitis, but it may occur primarily. A

stiffness of the nose and a discharge on the posterior pharyngeal wall may be observed. In all obscure fevers of childhood this site of infection should be borne in mind.

Do not forget that habitual lying on one side causes asymmetry of the skull in infants. Persistent lying on the back of the head often causes flatness of the occipital region.

Deformities of the thorax are most commonly caused by rickets and pulmonary disease. Soft bones and persistent stenosis of the nostrils are sufficient to cause flaring of the lower ribs.

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JULY

## EDITORIAL

### THE RESULT

THE collection of dues in a medical organization—or any other organization—is a task of no small difficulties. The man upon whom the work devolves likes it no more than the member who is appealed to to pay up.

In the past the Michigan State Medical Society has collected dues as fast as possible, but has been forced to keep the books open, and carry many of its delinquent members until December 31 of the year for which dues were being collected.

Last year was no exception. We labored all during the year, and on December 31, 1910, had received 1910 dues for 1942 members. We were compelled to remove 188 from the list on that date, for non-payment of dues.

In September last, at Bay City, the House of Delegates passed the resolution which has been heading our editorial page in bold-face type for several months. Up to and including May 31 this year we had received 1911 dues for 1966 members, a gain of 24. On the same date we removed from the list 217, an increase of 29. (Several of these have been returned since June 1st.)

The obvious deduction is that, in the collection of dues in a medical society, prompt and businesslike methods win. We have made a net gain in membership in five months over the number secured in twelve months last year.

### THE 46th ANNUAL MEETING

THE program for the Annual Meeting to be held in Detroit, September 27, 28, is nearly complete. The Medical and Surgical Section Programs are completely filled, but a few places are still open in the Gynecological Section.

All authors expecting to read papers are requested to send the titles of their papers, with short abstracts, not to exceed one hundred words, to the Secretary of the respective section, not later than July 20. This is to give the Section Secretaries time to prepare the program for publication.

The County Secretaries Association will meet September 26. All County Secretaries belong to this Association. Presidents of County Societies, and other officers, Councilors and officers of the State Society, are invited to be present and take part in the program and discussions. The object of this Association is to study and determine the best methods of conducting the affairs of the County Societies. The program is under the charge of Dr. W. C. Garvin, Secretary, Millington, Michigan.

Hotel rates to apply during the 46th Annual Meeting of the Michigan State Medical Society, Detroit, Sept. 27, 28, 1911:

Ponchartrain: European—	
without bath.....	\$2 00—\$2 50
with bath .....	3 00—5 00
Cadillac: European.....	2 00 and up.
American.....	3 50 and up.
Ste. Claire: American—	
without bath.....	2 50—3 00
with bath .....	3 50—4 00
Griswold: European .....	1 00—4 00
Wayne: European.....	1 00—3 00
Tuller: European .....	1 50 and up.



### THE HEALTH MASTER

**M**R. Samuel Hopkins Adams, the man who wrote the articles, "The Great American Fraud," in Collier's, a few years ago, has a continued story now appearing in the *Delineator*,\* "The Health Master:"—experiences of a young man as "Chinese doctor" in a private family.

Under peculiar circumstances Dr. Strong met a Mr. Clyde, and was engaged to look after the health of Mr. Clyde's family. The way Dr. Strong studies the children of the family, looking after their play, their habits, their health and nutrition; the way he looks after their home surroundings, their school surroundings, the surroundings of the farm which produces their milk, etc., is entertaining and educational.

The story is a strong advocate of medical inspection of schools, of proper enforcement of health laws and regulation in the community and in the home.

Mr. Adams has placed his instructive story in a magazine which is read by the mothers of the land, and if we hear mothers asking about adenoids, post-diphtheritic paralysis, measles, whooping-cough, unclean cow stables, flies, insanitary sewers, unventilated schoolrooms, and the like, we must attribute part, at least, of the good work, to the able pen of one of the ablest of literary allies of modern scientific and preventive medicine.

The suggestion is often made that the public be educated on health matters by articles in the lay press. When we prepare these articles let us make them entertaining as well as instructive.

### A BLACK EYE

**A** FEW times in its history the Supreme Court of the United States has been criticized for its decisions. This criticism seems to amount to lese majeste—witness

the clamor of a few months ago when Mr. Roosevelt criticized the Supreme Court and took exception to one of its decisions.

A few years ago, as the result of years of labor, we secured the passage of the "Pure Food and Drugs Act," one passage of which reads as follows:

"The term 'misbranded' . . . shall apply to all drugs . . . the package or label of which shall bear any statement . . . *which shall be false or misleading in any particular.*"

—(Italics ours.—Ed.)

Some months ago A. O. Johnson, a mail order cancer-cure quack of Kansas City, Mo., was taken before the courts for printing on the labels of his medicine bottles "misleading statements" regarding their curative effect. When the case came to court Johnson's lawyers held that the Food and Drugs Act was not intended to apply to claims relative to the curative effects of the medicine, but only claims about the composition. The lower court upheld this contention, and the case was appealed.

During the hearing before the U. S. Supreme Court, Solicitor General Lehmann\* maintained that, in drawing up the Food and Drugs Act, Congress recognized that it was just as important to deal with the curative effects of medicines as with their ingredients. Justice Lurton interrupted the Solicitor-General by asking whether such an interpretation of the law as the government desires "would not break up the patent medicine business." Mr. Lehmann replied: "It probably would, and I know of nothing within the scope of Congress that would be more beneficial."

The Supreme Court has confirmed the decision of the Lower Court,† Justices Hughes, Harlan and Day dissenting. No patent medicine manufacturer now need fear this law. He may make what-

\* The *Delineator*, May, June, July, 1911.

\*Journal A. M. A., April 22, 1911, Page 1203.

†See Page 357, and Jour. A. M. A., June 17, p. 1832.

ever extravagant claims he wishes in regard to the curative properties, providing he does not lie regarding the composition of his remedy. Lies regarding the curative properties are not "false or misleading in any particular."

This law was prepared and enacted by the people, not those trained to read two or more meanings where only one was intended, and this decision reads into the law something never dreamt of by its promoters. It was intended to benefit and protect the people from fraud; it is interpreted to benefit and protect from punishment the manufacturer of swindling, deceiving frauds in the shape of mislabeled patent medicine "sure cures."

#### THE HEALTH OFFICER OF BAY CITY AGAIN

THE public news recently contained a paragraph copied on page 358.

As noted a couple of months ago, the mayor of Bay City asked the Bay County Medical Society to nominate three men from whom he would select the health officer. Dr. Goodwin was selected.

Late in May Dr. Goodwin began investigating sanitary matters critically. So closely did he inspect the ice-cream factories and milk depots that a protest was made by the interested men, to the mayor.

Dr. Goodwin found that in scarcely a single instance was the ice-cream prepared in a sanitary manner. He found that frequently, even when arriving in the city in suitable condition as regards wholesomeness, milk becomes contaminated before being delivered to private homes.

This is only one activity of the new health officer, who is using his bacteriological knowledge and microscope in season and out. Fortunately, the mayor announces that he will stand back of his

health officer to any extent necessary in this work. As we stated before, we expect many things from Bay City, and indications are that we will not be disappointed.

#### THE YOUNG MEDICAL GRADUATE AND THE COUNTY SOCIETY

SHOULD the young medical graduate join a County Medical Society, or should he wait a few years? What benefit will the County Medical Society be to him, if any?

As a student he has spent years absorbing what he could of the plethora of old and new facts placed before him. He has been drilled in laboratory work; he has been quizzed on text-book and lecture work; he has written examination after examination; he has been taken around the wards and shown patients; but have his powers of clear thinking, of deduction, of expression, and confidence, been sufficiently developed?

If he finds himself deficient in any matter; if he feels the need of his old professor to confirm his diagnosis; if he feels the need of a strong man to share some of his responsibility; the young man will find all these things in the County Medical Society. He will find friends to whom he may go in need and in doubt; he will find a forum for discussion of his troubling problems; he will find in the Society the experience which must needs go with education and theory to make the successful physician.

The young man's training may have been all that is desirable. He may have been trained in English, and in expressing himself; he may be an accomplished diagnostician; even then the County Medical Society offers him decided advantages. Of what value to humanity in general, or the medical profession in particular for the young (or old) doctor

to be a master diagnostician, a master surgeon, or a master physician; of what value for a man to be able to make accurate observations and correct deductions, if he have not the ability, the confidence in himself, the confidence of his brother practitioners, or the opportunity, sufficient to place these special endowments where they will benefit more than his small coterie of friends and patrons?

The County Medical Society is designed and conducted to help its members in the manner suggested, but it does more. No one will contend that a man's education is completed when he leaves college—it is just begun. The doctor, above all others, must constantly labor to improve himself. Medical science is not founded upon precedent, but is a living, growing thing. The college cannot hope to give its graduates even all that is known at the date of their graduation. College training must be supplemented by other things, —by study and post-graduate work.

Here is the field of the County Medical Society.

\* \* \* \* \*

It is a function of the County Medical Society to develop its members, to encourage them to prepare and read papers, and to help them make their papers better. These Societies, meeting weekly, monthly, or quarterly, have a paper by some noted surgeon, or internist, or specialist from a larger and more favored medical center. They also have papers prepared by some of their own members, of value to all, but of decided value to the essayists.

Any Society that depends entirely upon outside talent for its programs is in the position of the student, looking up to the professor for confirmation or correction. Its members will in time lose their individuality. They are missing

an opportunity to add their quota to medical advance.

By joining the County Medical Society the young graduate allies himself with his confreres, his associates in a work of love and altruism; he lends his later knowledge of diagnostic and laboratory methods to his co-workers in exchange for their larger experience and greater understanding of the problems all about him.

He should early prepare and read a paper before his County Society, for the benefit of the friendly criticism he will receive. We know the novice says, "Let me have more time," "Let me see how others do, and I will do my part." The writer felt the same way not so many years ago, but the program committee insisted upon his reading a paper at the second meeting of the County Society after he graduated.

We believe this is the better way—it is none too early to begin this phase of a medical man's work. The longer he waits, the more papers he hears, the more timid he gets, with this result: a potentially active member becomes a passive one, a follower rather than a leader, and, who knows, a backslider, entirely dropping out of the Society.

By all means, young man, join the Society, join as soon as possible, then read a paper; it may be ever so short, and ever so modest, but it has taught you something of inestimable value: your own ability, as well as your present limitations.

#### ANTIVIVISECTION

A SERIES of colored cartoons showing the absurdity of the antivivisection movement, has been appearing in *Puck*.

The first of these, "Vivisection," appeared February 22, 1911. It represents a scientist operating upon an anesthetized rabbit, the anesthetist being seated and

showing care and caution by the expression on his face. The scientist has his knife poised in air, looking at expensively dressed women and men, "Sentimentalists," who exclaim, "For mercy's sake, stop!" Opposite are the lame, the halt, the blind, "The Sufferers," exclaiming, "For humanity's sake, go on!"

Number 2, March 22, 1911, represents a burning building, with firemen playing a stream of water on the fire, and others holding a "Vivisection Research Life Net." Women with pup dogs in their arms, and men, are pulling at the firemen supporting the life net, and those directing the stream of water, while one man with the axe "Legislation" is hacking at the fire hose. Beneath are the words, "Away with that life net."

The third cartoon, April 5, represents a shipwreck, with waves washing the deck. Sailors stand with drawn revolvers holding back men, women, and children, while the pet dogs are being safely stored away in the life boat. The subscription reads, "'Dogs First!' 'Women and children' would cease to be shipwreck etiquette if antivivisectionists had their way."

Number four appeared June 7th, and represents a gladiatorial forum. Prostrate on his back is "The Sick." With one foot on his chest and sword drawn stands "Death." Back of the rail are men and women, each with a pet animal, a diminutive dog, a rabbit, a cat, or a monkey, some with old maid's curls, and others with low retreating foreheads, narrow eyes and prominent jaws,—every one with thumbs turned down. Spread over the rail is a mantle "Antivivisection," showing in its center the lamp of "Progress" with light burning, but a hand with a candle extinguisher poised above it. The cartoon is labeled "Thumbs Down."

Let us hope that with the Prince of

Ridicule turned against them the antivivisectionists will soon cease their labors.

#### TO AMEND PURE FOOD AND DRUGS ACT

To amend Pure Food and Drugs Act, President Taft, on June 21, sent a special message to Congress, pointing out the immediate necessity of amending the Pure Food and Drugs Act in such a way that all misleading statements in regard to the therapeutic or curative properties of the preparation shall be absolutely prohibited. He urges that if this is not done the country will soon be over-run by vile frauds. Representative Sherley of Kentucky has introduced a bill bearing on the subject.

#### IN MEMORIAM

Dr. James B. Rice, of Flint, formerly a member of the Michigan State Medical Society, a graduate of the Detroit College of Medicine 1901, died May 31.

Per Herbert, of Iron Mountain, a member of the Michigan State Medical Society and the American Medical Association, and a graduate of Bellevue Hospital Medical College 1898, died recently.

Dr. T. H. McDonald, of Petersburg, a graduate of the University of Michigan, 1879, and member of the Monroe County Medical Society, Michigan State Medical Society and the American Medical Association, died June 20, aged fifty-seven.

Dr. Theodore E. Sands, of Battle Creek, a graduate of Starling Medical College, 1886, and member of the Calhoun County Medical Society, the Michigan State Medical Society, and American Medical Association, died June 22 at Detroit from mastoiditis with internal rupture, aged forty-eight.



## COUNTY SOCIETY NEWS

### CHARLEVOIX

May 26th Dr. B. H. McMullen, Councilor for the Ninth District, and the State Secretary, Dr. Wilfrid Haughey, met with seven of the doctors of Charlevoix County, and reorganized the Charlevoix County Medical Society. Dr. R. B. Armstrong was elected President, and Dr. A. M. Wilkinson Secretary. All those in attendance were enthusiastic about the organization, and decided to hold the lists open for a short time in order to get as many as possible to join with them. They are already planning active work along the line of a minimum rate bill, and other matters more of a public health nature.

### EATON

Resolutions of sympathy and respect on the death of Dr. G. B. Allen, of Charlotte Mich.

*Whereas* death having entered our ranks and removed from our midst our esteemed brother, Doctor Giles B. Allen, we feel that in his death the profession has lost a sincere and earnest practitioner and his family an affectionate and loving husband and father; therefore be it

*Resolved*, That we tender to the family and friends of our deceased brother our sincere sympathy, and

*Resolved*, That a copy of these resolutions be sent to the wife and children of the deceased; also that they be spread on the minutes of this meeting, and further, that a copy be sent to the JOURNAL OF THE MICHIGAN STATE MEDICAL SOCIETY for publication.

Passed at a meeting of Eaton County Medical Society at Charlotte, April 27, 1911.

C. B. WASSON, *Pres.*,

A. H. BURLERSON, *Sec.*

### GENESEE

A special meeting of Genesee County Medical Society was held May 30th, at Genesee Club, Flint, Michigan, for the purpose of adopting the revised amendments.

Dr. H. Cook gave an interesting talk on "Urethral and Prostatic Inflammations." The subject was thoroughly discussed. Two new members were received. Dutch Lunch was served.

C. P. CLARK, *Secy.*

### GRAND TRAVERSE

The regular monthly meeting of the Grand Traverse-Leelanaw County Medical Society was held in Dr. Holliday's office. Ten members were present. Minutes of last meeting were read and approved. A letter was read from the State Secretary regarding the dropped members.

It was voted to have a committee appointed to confer with the woman's club in order to secure their aid in procuring a hospital.

It was decided to hold the annual picnic July 14 at Dr. Fralick's cottage on Glen Lake.

Dr. Minor read a paper entitled, "Infantile Spinal Paralysis." A general discussion followed. Dr. Wells read a paper entitled "Ehrlich's 606." This paper was followed by a general discussion, after which the Society adjourned.

R. E. WELLS, *Secy.*

### GRATIOT

Dr. A. L. Seeley, Councilor for the Eighth District, and the State Secretary, Dr. Wilfrid Haughey, met in Alma with about nine of the doctors, members of the Gratiot County Medical Society before it disbanded last winter. The Gratiot County Medical Society was reorganized, with Dr. C. B. Gardner, of Alma, President, and Dr. W. E. Barstow, of St. Louis, Secretary. All those attending the meeting were sanguine of a good live Society, the same as Gratiot County has supported in past years. Plans are under consideration looking toward the Tuscola plan of caring for the county poor.

### HURON

The regular quarterly meeting of the Huron County Medical Society was held in Bad Axe, May 22, 1911, in the afternoon. The President, Dr. F. E. Luton, of Kilmanagh, occupied the chair. Dr. W. J. Kay, of Lapeer, Councilor of the Fifth District, read an interesting paper on "Optimism in Medicine," Dr. T. S. Conover, of Flint, read an instructive paper on "Diphtheria," and Dr. A. L. Seeley, of Mayville, Councilor of the Eighth District, favored the members with a talk on "How the Tuscola County Medical Society Takes Care of the County's Poor." All papers were thoroughly discussed. A com-

mittee of three was appointed to ascertain the feasibility of doing likewise in Huron County. A supper was given to the visiting doctors, at which Dr. Freeland acted as toastmaster.

D. CONBOY, *Secretary*.

### MUSKEGON-OCEANA

Regular meeting of the Muskegon-Oceana County Medical Society was held with Drs. Campbell and Quick, at the Occidental Hotel, Friday, April 28, 1911.

Meeting called to order by the President at 8 p. m. following 6 o'clock banquet.

Members present: Drs. G. S. Williams, L. I. Powers, F. W. Garber, J. F. Denslow, B. F. Black, A. A. Smith, C. P. Donelson, F. B. Marshall, W. E. Dockry, W. P. Gamber, I. M. J. Hotvedt, L. N. Eames, J. T. Cramer, W. A. Campbell, and P. A. Quick. Dr. Bussard as visitor.

Communication from Dr. Harison read. Dr. Dockry moved the letter be placed on file. Seconded and carried.

Paper by Dr. Campbell, "Sepsis Following Induced Abortion." The discussion was opened by Dr. P. A. Quick and followed by Drs. L. N. Eames, F. B. Marshall, C. P. Donelson, W. P. Gamber, B. F. Black, W. E. Dockry, J. T. Cramer, G. S. Williams, A. A. Smith, and W. A. Campbell closed the discussion.

Meeting adjourned.

J. T. CRAMER, *Secretary pro tem*.

### ONTONAGON

At a regular meeting of the Ontonagon County Medical Society held on May 25, Dr. C. L. Rumph resigned the office of President, and Dr. F. J. Larned, of Greenland, was elected President for the remainder of the term.

Dr. C. L. Rumph has moved to Green Bay, Wis.

It was moved, seconded and carried, That we favor the plan to make membership in the American Medical Association a requirement of every member of the County and State Society, and that none be admitted into the American Medical Association except members of the various State Societies.

J. S. NITTERAUER, *Secretary*.

### SCHOOLCRAFT

At a special meeting of the Schoolcraft County Medical Society, held May 18, the following resolutions were adopted:

Whereas, Death has removed from our Society a brother practitioner, a faithful and up-

right friend and colleague, Dr. Samuel S. Hackwell, of Blaney:

Therefore, *Resolved*, that in the untimely death of Dr. Hackwell our Society sustains the loss of an honored and beloved member, one who always inspired by his cheerfulness and was most helpful in his relations not only with his fellow practitioners but with all who had the privilege of knowing him.

*Resolved*, That his pleasing disposition, his earnest and consistent friendships and his many manly virtues be held in grateful remembrance.

*Resolved*, That this Society, feeling its own loss, most sincerely extends its sympathy to the widow and friends on the occasion of their deep sorrow.

*Resolved*, That a copy of these resolutions be spread upon our records, a copy sent to Mrs. Hackwell, and a copy furnished to the JOURNAL for publication therein.

FRANK RAINIE,

D. W. ROOS,

G. M. LIVINGSTON,

*Committee of Schoolcraft County Medical Society.*

G. M. LIVINGSTON, *Secretary*.

### WAYNE

At the last General Meeting of the Wayne County Medical Society the nominations for officers for the year 1911 to 1912, which at the same time was equivalent to an election, resulted as follows: President, Dr. H. O. Walker, Vice-president, B. R. Schenck, Secretary-treasurer, R. C. Jamieson.

The paper of the evening on

### The Relationship Between Dreams and Psycho-Neurological Symptoms

was read by Ernest Jones, of Toronto.

*Abstract:* The main thesis of the paper was that there exists a far-reaching resemblance between the psychological characteristics and mechanism of dreams and psycho-neurotic symptoms, and that this fact has important bearings in regard to both psycho-pathology and therapeutics. The resemblances were classified under the four following headings:

*General Characteristics.* Both manifestations appear to be meaningless and unreasonable; both are readily forgotten and tend to get falsified in later recollection of them.

*Clinical Relations.* Many symptoms actually date from a given dream. Certain symptoms greatly resemble dreams, the so-called hysterical dream states; often the content of a symptom—for instance, a phobia—appears directly in a dream. The underlying mental material from which

dreams and symptoms are derived is often identical.

*Structure.* Both dreams and neurotic symptoms are compromise-formations, being formed as the result of an interaction between two opposing sets of forces, viz., certain buried mental processes that are unacceptable to the conscious personality, and, on the other hand, the social and ethical inhibitions that act as a censor in keeping these processes from consciousness. When the two manifestations are unravelled by means of psycho-analysis, it is found that the causative mental processes, which is called the latent content, are always entirely logical and full of meaning. They have, however, become distorted through the action of the censor. The mechanisms by means of which this distortion is brought about (condensation, displacement, reversal, etc.) are almost identical in the cases of both dreams and symptoms.

*Latent Content.* In both cases this is unconscious, that is to say, the mental processes are unknown to the conscious personality, it is always highly significant in its nature, it always takes its root in early childhood memories, and it is always of a sexual nature.

The analysis of dreams furnishes the best method for the study of the unconscious conflicts which play so large a part in both the neuroses and the psychoses. It thus enables one to understand the individual psycho-genesis of a given cause, giving a correspondingly greater power of dealing with the causative factors. The actual dream analysis is of itself of great therapeutic value because it fuses the opposing sets of forces, the conflict between which is the main cause of the neurosis.

The paper was discussed by Drs. E. A. Christian, of Pontiac, Albert M. Barrett, of Ann Arbor, David Inglis, Emil Amberg, Chas. W. Hitchcock, and L. E. Emerson, Ph. D., of Ann Arbor.

The following new members were admitted: Wm. H. Price, O. T. Toepel, Edward Bawl, R. Y. Young. As associate member: A. P. Chesterfield, D. D. S.

For gifts received, a vote of thanks was extended to the following members: Dr. L. E. Maire, for Biography of Ephriam McDowell, M. D.; Dr. Cruickchank, for unbound files of British Medical Journal; Drs. Connor, for a picture of Leartus Connor, Dr. F. C. Kidner, for Reprints; Dr. Chas. Hitchcock, for unbound files of Journal of Nervous and Mental Diseases and Journal of Neurology and Psychiatry; Dr. Leartus Connor, for 457 more books; Dr. W. H. Morley, for 51 more

books; Dr. Thaddeus Walker, for 3 steins.

The revised Owen Bill was approved by the Society, and returned to the legislative committee for action.

The last meeting of the Wayne County Medical Society for the year 1910 to 1911 was held at the Wayne County Medical Building on Monday, May 29, 1911. No scientific paper was read. The casting of ballots for officers of the Society for the coming year was as follows: President, H. O. Walker; Vice-president, B. R. Schenck; Secretary-treasurer, R. C. Jamieson.

The Reports of the Library, House and Finance Committees were accepted (a copy of these will appear below).

The new members admitted into the Society were as follows: L. J. Seville, E. J. O'Brien, F. E. Pilcher, L. M. Lawton, R. J. McClellan, H. J. Maus, G. V. Oill, Geo. G. Harris, H. B. Williams, J. H. Neary, F. J. McDonnell, Leo. Pulford.

The following gifts were received and a vote of thanks was offered the donors:

From Dr. Herman Kiefer, 351 bound volumes, 1 bookcase and 3 pictures; from Dr. J. H. Carstens, 61 bound volumes and unbound files; from Dr. R. G. Owen, 1 bound volume.

Drs. Angus McLean and H. O. Walker have each subscribed \$1,000 towards the building of the Auditorium.

For the entertainment of the evening, Mr. Leonard Carley and Dr. W. A. Spitzley sang, and Dr. C. R. Davis played a violin solo. Mr. Frederick Morse was the accompanist.

#### REPORT OF HOUSE COMMITTEE

##### *Receipts*

##### From Cigars and Liquors

October .....	\$78.55
November .....	64.95
December .....	68.70
January .....	59.75
February .....	61.52
March .....	73.93
April .....	80.70
May to date .....	72.95

Total..... \$561.05

##### From Other Sources

Dr. Maire Dinner .....	\$12.00
Polyclinic Lunch .....	6.65
Trustees for Smoker .....	80.68
Ex-Pres. for Reception .....	130.00
Mrs. Moore for Board .....	5.25

Old Iron.....	5.25
From Dr. Shamberg's Dinner.....	54.00
Kitty.....	24.77

Total.....	\$318.60
Sum total of receipts.....	879.65

*Disbursements*

Laundry.....	\$50.62
Ice.....	18.50
Coupon books, visitors and gift book and Library supplies.....	42.90
House supplies.....	5.85
House cleaned.....	11.50
Freight.....	.45
Rent for silver.....	.80
Sponges in cigar case.....	1.00
Framing of pictures and house rules....	7.85
Varnishing linoleum.....	6.00
Whiskey decanters.....	2.50
Highball, cocktail, water and ice tea glasses.....	16.81
Beer mugs.....	6.33
Cigars and liquors.....	355.65
Shamberg Dinner.....	35.00
Ex. Pres. Reception.....	110.81
Smoker.....	80.68
Balance on hand in Bank.....	126.40

Sum total of disbursements.....	\$879.65
Due on cigars and beer.....	4.15
Due from Dr. Shamberg Dinner....	14.00
	\$18.15

## REPORT OF THE FINANCE COMMITTEE

*Receipts*

June 17, 1910, to May 27, 1911

Subscriptions.....	\$13,882.25
Rentals.....	652.50
Defence League.....	1233.81
Wayne Co. Medical Society.....	1000.00
Medical & Library Ass'n.....	382.70
Interest.....	.91
Sale of bath tub.....	25.00

Total Receipts.....	\$17,177.17
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*Disbursements*

Paid on building.....	\$12,500.00
Interest and exchange.....	312.75
Collection expense.....	129.61
Furnishing acct.....	1473.11
Maintenance acct.....	1760.47
Library acct.....	943.43
Balance on hand.....	57.80

Total disbursements, \$17,177.17	
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## REPORT OF THE LIBRARY COMMITTEE

Number of non-duplicate volumes.....	7,780
Duplicates accessoried and listed for exchange.....	2,705
Number of pamphlets and unbound reprints.....considerable, not yet counted or catalogued.	
Current journals coming to the library...	78
Amount of special subscription to periodical fund.....	\$165.00
Received from the sale of old paper.....	6.74
Total receipts.....	\$171.74
Total expenditures for Journal subscription.....	101.57
Balance in subscription fund.....	70.17

The appropriation of \$100 voted by the Board of Trustees in November last, to be expended for periodical subscriptions, has not been used.

Respectfully submitted,

B. R. SCHENCK,  
G. L. CONNOR,  
W. J. WILSON, JR.,  
V. C. VAUGHAN,  
R. W. OWEN,  
H. N. TORREY,  
H. A. SAFFORD,  
Committee.

As can be seen from the reports of the different committees, especially the finance committee, the present year has been a banner year for the Wayne County Medical Society. A Medical Home, so long the cherished hope of many members, has been placed upon a sound footing. The progress made during the past year has far exceeded the expectations of the individual members, and more especially of those who were prime "boosters" in the undertaking of "A Medical Home."

There are at present six hundred members in our Society. Of these six hundred only about half have subscribed to the building fund. This half or these three hundred members have subscribed about \$40,000, and have paid in \$12,882.25, over a third of the whole subscribed sum. The members who have not yet subscribed ought to do so in the near future. Get a subscription blank from the librarian or one of the committee (F. B. Tibbals, A. D. Holmes, E. B. Smith, B. R. Shurly, H. W. Longyear) and do not wait until you are approached. The men comprising the subscription committee are all busy practitioners, and if in any way the members of the Society can lessen the amount of their work



they certainly ought to do so. The best possible way to do this is to pay your subscription promptly, if you are a subscriber, and if you are not a subscriber, to get a blank and subscribe at once.

At the meetings which during the past year have had larger attendances than ever before, the urgent need of an auditorium has been demonstrated over and over again. If each member will do his share, this building could be built and be ready for use in September.

Even with subscriptions from only half of the members the Society is to be congratulated upon the manner in which it has conducted, and in the short space of a year almost completely paid for its New Home. Now that this home is established, we as medical men ought to patronize it. Not only the subscribers, but all members as well as associate members, are welcome. During the summer months the cafe service and the library will be conducted in the same way as it has been during the winter months. Any person interested in medical affairs is welcome to the use of the library.

R. C. ANDRIES, *Correspondent.*

## NEWS

The Upper Peninsular Medical Society will hold its nineteenth Annual Meeting at Escanaba July 27-28, 1911. This Society comprises the County Societies of the Upper Peninsular, and meets each year under the auspices of one or more of the County Societies. The program is under preparation, and will be well worth attending. Delta County invites the Council and members of the State Society generally to attend this meeting.

President Taft has made the following additional appointments to the Medical Reserve Corps of the army to rank as first Lieutenants from May 12, 1911: Frederick H. Newberry, Detroit; Emil H. Webster, Sault Ste. Marie; Charles G. Jennings, Detroit; Hugo A. Freund, Detroit.

To rank from May 26th: James E. Mead, Detroit; Reynolds C. Mahaney, Owosso.

Dr. F.B. Marshall, of Muskegon, announces the limitation of his practice to Surgery and Surgical Diseases.

Doctor and Mrs. P. B. Hardy, of Tecumseh, are in Vienna this summer, having sailed on the 18th of June.

## MORE VARIED HOSPITAL WORK FOR SENIOR MEDICS

A new system of sectional hospital work will be inaugurated in the Medical Department of the University of Michigan, with the next school year, whereby seniors will have opportunity for a wider experience in hospital work than they now have. Under the present arrangement, the seniors are divided into special staffs of a few men, each assisting the various departments in the hospital, such as the eye and ear, medical, surgical, and other departments. As the student usually assists in only one of these departments, he does not get so general a knowledge of the entire field of hospital work as he will under the new sectional system. The surgical staff alone will be retained as in the past.

According to the new plan, the senior class will be divided into six sections, and the school year will be divided into the same number of periods. Each section will do work in each one of the departments of the hospital during the school year, taking its turn in each department during one period of the year. It is planned in this way to give the student of the Medical Department a practical training in all branches of his profession before he is graduated.

The amount of recitation work by seniors will probably be cut down somewhat on account of the demands which the new hospital arrangement will make upon the students' time.

## CAN LABEL DRUGS AS "SURE CURES"

Washington, May 29.—Medicine which is nothing but sweetened water or pills composed of colored mud, may be called "cures" and sold as such with impunity under the national pure food and drugs act, according to a decision rendered today by the United States supreme court in the case of Dr. O. A. Johnson, of Kansas City, Mo. Provided there is no misstatement on the bottle or package as to its contents, the manufacturer is free to sell his goods. Justice Holmes announced the majority opinion, Justice Hughes delivering a dissenting opinion, in which Justices Harlan and Day concurred.

The court acknowledged that "in a certain sense the statement on the label was false, or at least misleading," but it held that the language of

the pure food law is such that the statement contained therein as to the meaning of mis-branding "is aimed not at all possible false statements, but only at such as determine the identity of the article, possibly including its strength, quality and purity."

If a label were to state that the contents of a bottle was water when as a matter of fact it was other than water, it would come under the mis-branding in the meaning of the law, according to to-day's opinion. But the opinion adds that when the statement on the box or bottle of medicine is "shown to be false only in its commendatory and prophetic aspect," when the contents were "undescribed and unknown," it did not come within the act.—*Detroit Free Press*, May 30, 1911.

### WILL CLEAN UP BAY CITY

Dr. Edwin Goodwin, the new health officer, after a month of preparation, including a two weeks' post-graduate course "brushing up" on bacteriology and microscopic work at Ann Arbor at his own expense, started in a sanitary inspection of Bay City such as the town has never before enjoyed. He expects to be busy a couple of months, as he will review the sanitary conditions surrounding all meat markets, dairies and milk depots, restaurants, grocery stores, ice cream plants, slaughter houses, bakeries, candy stores and a number of places where other articles of food are made. His procedure will be novel in that he has secured the free services of several men who are experts in their various lines of business.

Goodwin is a young man, only a half a dozen years out of the U. of M., and he was given his appointment by Mayor Woodworth with the specific understanding that he would put ginger into the health department and its work.—*News Item*.

### BOOK NOTICES

**1000 Surgical Suggestions.** By Walter M. Brickner, B. S., M. D., Adjunct Surgeon Mount Sinai Hospital, Editor-in-Chief American Journal of Surgery, with the collaboration of James P. Warbasse, M. D., Harold Hays, M. D., Eli Moschowitz, M. D., and Harold Neuhoof, M. D. 225 pages. Cloth bound semi-de luxe, \$1.00. Full de luxe, leather, \$2.25. Surgery Publishing Company, 92 William Street, N. Y., U. S. A.

In 225 pages the editors have collected one thousand succinct and instructive hints based upon actual surgical experience.

The Suggestions are so arranged and indexed that all subjects covered can be immediately referred to, and the particular hint upon any

particular subject immediately found. It bristles with pointed and useful suggestions which in many cases might just turn the scale from failure to success. Its mechanical presentation is a feature worthy of mention. It is square cloth bound, stamped in gold, printed upon India tint paper with Cheltenham type, and special marginal side headings in red. A dollar could not be better invested than in the purchase of this book.

**Diagnosis and Therapeutic Technic.** By Albert S. Morrow, M. D., Adjunct Professor of Surgery, New York Polyclinic. Octavo of 850 pages, with 815 original line drawings. Philadelphia and London: W. B. Saunders Company, 1911. Cloth, \$5.00 net.

This book is printed on excellent paper in a large, easily read type, with each paragraph indexed in black-face letters. The illustrations are profuse, and minutely outline the various procedures.

The first two chapters are on general and local anesthesia. These two chapters are complete and valuable. They cover eighty-nine pages and seventy-five illustrations, and include preparation for anesthesia, a consideration of the stages of anesthesia, ether anesthesia, chloroform anesthesia, and the administration of each; nitrous oxid anesthesia and the nitrous oxid and ether sequence, ethyl chloride, anesthetic mixtures, special methods,—as intubation anesthesia, tracheal opening anesthesia, rectal anesthesia, scopolamin-morphine anesthesia, accidents and their treatment; after-effects of anesthesia; after treatment of general anesthesia.

The chapter on local anesthesia is similarly handled, as are chapters on sphygmomanometry, transfusion of blood, infusion of salt solution, hypodermic and intramuscular injection of drugs, Bier's hyperemic treatment, collection of pathological material, and a dozen other headings that we do not have room to mention. The book condenses all this material into an easily accessible form and will undoubtedly meet with a generous welcome.

**State Board Questions and Answers.** By R. Max Goepf, M. D., Professor of Clinical Medicine at the Philadelphia Polyclinic. Second edition revised. Octavo volume of 715 pages. Philadelphia and London: W. B. Saunders Company, 1911. Cloth \$4.00 net; half morocco, \$5.50 net.

For one who contemplates taking a State Board Examination, or an Army or Navy examination, and wishes to brush up on so many points on which the practitioner necessarily gets rusty, this book could not be improved upon. Questions are asked and answered touching every conceivable subject. The questions are actual questions asked during the past four years,—

chiefly in the larger and more representative States.

The index is complete, covering fifty-five double column nonpareil pages.

**The Wizard of the Damavand, a Tale of the Crusades**, by J. Richardson Parke, M. D., Sc. B., Ph. G., with twenty-eight illustrations. Professional Publishing Co., Philadelphia, 1910.

In this story Dr. Parke has presented a weird tale of the dim and distant past, teeming with strange situations and phenomena. The interest does not flag from cover to cover, and the climaxes are so arranged that one cannot help neglecting other things until he has finished the story. Dr. Parke neglects to give us his method of restoring the dead to life, but this scene is vivid, to say the least, giving us an honest, upright man instead of a scoundrel.

**A Treatise on Diseases of the Nose, Throat and Ear**. By William Lincoln Ballenger, M. D., Professor of Laryngology, Rhinology and Otology in the College of Physicians and Surgeons, Chicago. New (3d) edition, thoroughly revised. Octavo, 983 pages, with 506 engravings, mostly original, and 22 plates. Cloth, \$5.50, net. Lea & Febiger, Philadelphia and New York, 1911.

Ballenger has covered both the medical and surgical aspects of the field of ear, nose and throat disease completely and entertainingly. His English is easy to read, his description clear, and, best of all, his illustrations are all that one could desire. Operations and even the various steps are pictured clearly, thus allowing the reader to follow in detail the description of the text.

This book was prepared by securing the reprints of articles and monographs from all over the world and incorporating the material thus obtained. The same method has been used in the revision, thus giving the reader the very best and the very latest information.

**A Handbook of Practical Treatment**. In three volumes. By seventy-nine eminent specialists. Edited by John H. Musser, M. D., Professor of Clinical Medicine, University of Pennsylvania, and A. O. J. Kelly, M. D., Assistant Professor of Medicine, University of Pennsylvania. Volume II; Octavo of 865 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1911. Per volume, cloth, \$6 net; half morocco, \$7.50 net.

Volume II of "Practical Treatment" is now being delivered, and cannot fail to please all who receive it. The general scope of this work was touched upon somewhat in our review of Vol I, as was also the splendid manner in which the subjects are handled. At this time, however, we wish to say that Vol II fulfills in every way all anticipation aroused by a study of Vol I. It considers the heart and infection diseases, and it is the method of handling these subjects that makes the work unique. In the treatment of typhoid fever the Brand method of tubbing is

fully illustrated, and all the different methods of hydrotherapy, both in private and hospital practice, are described. The reviewer is pleased to note that warmer baths are advocated, the first bath not below 85°. This is more rational, and can be endorsed by many who have strongly revolted at the cold and ice baths previously recommended. In diphtheria the operations of intubation and tracheotomy are fully described and illustrated.

This is important, for, notwithstanding its heroic use of antitoxins, there are cases of laryngeal diphtheria where the child will surely die of asphyxiation before the antitoxin has time to dissolve the membrane and reduce the tumefaction unless either intubation or tracheotomy be done. Such a case occurred in the practice of the reviewer only last week.

The description of sanatoria and out-of-door treatment of tuberculosis by means of abundant illustrations is as refreshing as it is rare. It lends charm to the subject, aids in understanding what is intended to be conveyed, and beautifies the book. The volume fully complies with the modern idea of teaching the Practice of Medicine, and will surely be so regarded by all who possess themselves of it.

**A Text Book of Medicine for Students and Practitioners**. By Dr. Adolph V. Strumpell, Professor of Special Pathology and Therapeutics at the University of Leipzig. Fourth American edition, translated from the eleventh revised German edition by Herman F. Vickery and Philip Coombs Knapp. With six plates, three of which are in color, and two hundred and twenty-four illustrations in the text. Two volumes. New York and London: D. Appleton & Co.

The fourth American edition of Strumpell's Text Book of Medicine, in two volumes, translated from the seventeenth revised German edition, is on our desk for review.

The value of this work is attested by its worldwide recognition. The fact that the book has passed through seventeen German editions shows the respect and the esteem in which it is held by our very critical and scholarly friends in that country. It has also been translated into the French, English, Italian, Spanish, Russian, Modern Greek, Turkish and Japanese. Some of these translations have had several editions, as is the case with the English, the present being the fourth in America.

Characteristic of the work is the impression conveyed of the thorough personal knowledge possessed by the author of the subject treated. No hesitating statements, no references to some one else on mooted points, with the obvious intention of relieving the author of the responsi-

bility of committing himself, have been found by the reviewer.

The entire field of Internal Medicine is covered. Each individual disease is treated at length, or sufficiently so. In the primary disease the Etiology, Pathological Anatomy, Symptoms, Diagnosis, etc., are given. Complications are given special attention, and Treatment follows the whole.

The student or practitioner who guides his

course by this work may be assured that he is relying upon a standard work of world-wide authority and recognized in every land.

The translation is exceptionally good when we consider how closely the text has been followed. A few mannerisms will be found. These lend spice to the subject, and help one to remember not only the statement made but its German authenticity. I would not have them removed.

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Fowler, Walter N., Tecumseh	Univ. of Mich. Homeo. College, 1889	Rec. Qual. No. II with Indiana	5-6-11
Porter, Ward K., Detroit	Northwestern Univ. Med. School, Chicago, Ill., 1907	Rec. Qual. No. I with Illinois	5-8-11
Todd, George M., Toledo, Ohio	Univ. of Pa., Philadelphia, Pa., 1894	Rec. Qual. No. I with Ohio	5-24-11
Dolman, Ernest N., Detroit	Detroit College of Med., 1910	Exam. Detroit, May, 1911, 84.65%	5-27-11
Miller, Richard J., Bessemer	College of Physicians and Surgeons, Chicago, Univ. Illinois, 1910	Rec. Qual. No. I with Illinois	5-31-11

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